

POST EARTHQUAKE INVESTIGATION TEAM (PEQIT) MANUAL



AUGUST 2005

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INTRODUCTION

The Post Earthquake Investigation Team (PEQIT) gathers information about the performance of bridges and other highway structures after a large earthquake. This information is used to evaluate Caltrans' current design and retrofit procedures. Because highway damage is removed or repaired very quickly after an earthquake, the PEQIT must be single-minded in their pursuit of data. Although there are constant demands from professors, reporters, engineers, and residents after an earthquake, the PEQIT cannot allow itself to be sidetracked. A successful post earthquake investigation depends on preparation, organization, coordination, communication, and cooperation. It depends on a commitment on the part of all members, but it also depends heavily on safety. The highway is a particularly dangerous place after an earthquake and the PEQIT must remember that no piece of information is worth endangering one's life.

CURRENT PEQIT ROSTER (August 2005)															
PEQIT/OEE HOTLINE 227-8804															
Coordinator Mark Yashinsky / Home 485-3448 / Cell 826-6609 / Work 227-8719 / Pager 948-1851															
#	NAME	OFFICE	WORK PHONE	HOME PHONE	A	B	C	D	E	F	G	H	I	J	K
1	Fadel Alameddine	Earthquake				X		X	X	X	X	X	X	X	X
2	Bob Tanaka <i>Asst. Coord</i>	Earthquake				X			X	X	X	X	X	X	X
3	Clark Verkler <i>Climb</i>	Earthquake			X			X	X	X	X	X	X	X	X
4	Steve Mitchell (DC)	Earthquake			X			X			X	X		X	X
5	Don Lee	Earthquake									X	X	X	X	X
6	Jaro Simek (<i>EIC Liaison</i>)	Earthquake				X	X				X	X	X	X	X
7	Richard Heninger	Earthquake										X	X	X	X
8	Jim Gutierrez (L, DC)	Earthquake			X		X	X					X	X	X
9	Saad El Azazy	Earthquake											X		X
10	Allaoua Kartoum	Earthquake					X						X	X	X
11	Ski Brown	Earthquake					X							X	
12	Abhijit Naik	Earthquake													X
13	Chris B Cambell	Earthquake													
14	Matthew Socha	Contracts													X
15	Rod Simmons (DC)	SFOBB			X		X	X	X		X			X	X
16	Robert Zezoff	Local													
17	Sue Hida (L)	Design							X	X	X	X	X	X	X
18	Kevin Harper	Design				X		X	X		X	X			X
19	Pete Soin	Design					X	X			X		X	X	X
20	Jarrett Woodruff (DC)	Design					X					X		X	X
21	David Alvarez	Design							X		X		X		
22	Ron Bromenshenkel	Design						X	X		X		X		X
23	Mike Pope	Design													X
24	Paul Chung	Bridge													
25	Tony Brake	Bridge													
(* Cell Phone #, L-Laptop, DC-Digital Camera)				F Attended 2000 Geology & Retrofit Training											
A Rope Climbing Training				G Attended 2001 Seismology Meeting											
B Earthquake Investigation Experience				H Attended 2002 Meeting											
C Completed Digital Photography Training (2004)				I Attended 2003 Meeting											
D Attended 1998 Orientation Meeting				J Attended 2004 Meeting											
E Attended 1999 Equipment Training				K Attended August 2004 Confined Space Training											

EARTHQUAKE INVESTIGATION PROCEDURE

- **PEQIT Coordinator is notified of a large, damaging earthquake.**

Caltrans' Highway Communication Center (CHCC) will telephone the Chief of the Office of Earthquake Engineering (OEE) or the PEQIT coordinator, usually within half an hour after an $M > 5.5$ earthquake occurs. The CHCC will report the magnitude and time of the event, the latitude and longitude, and the geographical location. Alternatively, the Coordinator may receive notification of a large earthquake on the SMIP CDMG pager, the Redi-CUBE System, or from another source. After receiving notification, the Coordinator should contact the OEE Chief, the OEEDS Chief, the SD Chief, and the DES Director.

- **Coordinator determines geographic area to be investigated.**

The Coordinator can estimate the extent of strong ground shaking by drawing a contour line around the fault rupture. For well-compacted soils a magnitude 7.5 earthquake will cause strong shaking in an area 80 miles long by 40 miles wide. A magnitude 7.0 earthquake will cause strong ground shaking in an area approximately 30 miles long (in the direction of the fault rupture) by 15 miles wide. A magnitude 6.5 earthquake will cause strong shaking in an area about 12 miles long by 6 miles wide. Weak soil and other geologic (and topographic) features can cause higher ground shaking to a wider area. The coordinator may call on the staff seismologist for assistance in determining the area of strong ground shaking. Bridges and highways within the area of strong shaking should be investigated.

GIS software can create a map of the area of suspected damage and a list of bridges that have been strongly shaken based on the above-described geologic and seismic features. The Coordinator has a copy of ARC-VIEW Software that can be used to produce maps and lists of bridges after an earthquake. This program needs to be updated periodically with lists of bridges and the newest seismic hazard map.

The Internet has made obtaining information about earthquakes easier. Shakemap (<http://pasadena.wr.usgs.gov/latest/shakingmaps.html>) will provide a detailed map showing the intensity of ground shaking, it will notify subscribers with an email after a $M > 4.0$ earthquake occurs, and can be used with ARC-VIEW to create lists of potentially damaged bridges following large earthquakes.

The Log of Bridges on State Highways lists all bridges by post mile for every route in each district. Once the area to be investigated is determined, the coordinator can use the 'Log' to create a list of all the bridges in the impacted area.

Local bridges are difficult to locate. The coordinator has a set of county maps with local bridges identified on them. The PEQIT investigators assigned to investigate the performance of local agency bridges should copy relevant county maps.

- **Coordinator uses roster to contact sufficient engineers for investigation.**

The goal in selecting engineers is to obtain a mixture of experienced and new earthquake investigators so that everyone can gain experience without jeopardizing safety, efficiency, or the quality of the final report.

- **Coordinator obtains information for PEQIT.**

There is a great deal of information that can help the team conduct a thorough, productive investigation. This information may include lists of routes and bridges in the area of strong shaking, maps of roads, areas of weak soils, and as-built plans of affected bridges. The coordinator will attempt to obtain relevant damage and road closure information for use by the PEQIT.

- **Coordinator makes arrangements for transportation and lodging of PEQIT.**

Vehicles may be obtained from Donna Roberts at Local Assistance (227-3330), from Frances Banda at Preliminary Investigations (227-8164), from Rhonda Reynolds at Pavement Testing (227-1985), or from Kendra Callahan at Testing Services (227-7020). It may also be possible to borrow a vehicle from Structures Maintenance (227-8843) or from the Mechanical and Electrical Sections (227-8337). They can also be obtained (**using the blue General Services card**) from the State Garage at 1416 10th Street (657-2327) or from a car rental agency. One vehicle is typically needed for each two-member team. Whenever possible, 4 wheel drive vehicles should be obtained. Sometimes, airplane flights will be arranged and the PEQIT will rent vehicles at the airport. For most earthquakes, public and private transportation should be sufficient. However, for extremely large earthquakes, roads and public airports may be too damaged to provide service. In those cases, the coordinator should call Caltrans' emergency coordinator, John Cottier (654-3102) to arrange transportation through the National Guard.

Lodging near the area of damage can be found from the Yellow Pages in the Transportation Research Center, on the Internet, or from the information operator by calling the Area Code + 555-1212. In some circumstances, tents might be required. It is always beneficial to coordinate lodging with Structures Maintenance or other earthquake investigation teams. In this way, investigators can meet in the evening to exchange information.

- **Coordinator assembles, packs, and writes list of equipment for PEQIT.**

Cellular phones are a useful way of providing breaking information between PEQIT members, between the team leader and the coordinator, with district engineers, maintenance engineers etc. The coordinator has three cellular phones for use by the PEQIT. The Coordinator also has pagers and a portable Caltrans radio. Immediately after the Northridge earthquake, the cellular telephone system was unable to handle the huge demand placed on it. However, the PEQIT Leader should still be able to keep in contact by tuning the portable Caltrans radio to the appropriate district. Instructions for using the radio are included, and PEQIT candidates should practice using the radio before an earthquake occurs.

Other equipment such as hard hats, orange vests, cameras, etc. are also available. The PEQIT members must sign out all equipment and are responsible for its safe return to the coordinator. Since the amount of equipment available is limited, during very large earthquakes the PEQIT members may have to use some of their own supplies. The equipment section provides a list of what is available for the PEQIT.

- **Members pack and assemble at the Division of Engineering Services (DES).**

When engineers are notified by the coordinator, they should immediately pack all personal items that are needed for an investigation. This may include suitable outdoor clothing for several days away from home, cameras, water, food, and anything else that will allow the investigator to survive in harsh conditions, possibly without lifelines during the investigation. The members should keep a checklist of necessary items, including any prescription drugs, and be able to assemble these items quickly. They should then quickly assemble in Room 212 of Farmers Market Plaza I (FMPI) at 1801 30th Street or in the Coordinator's cubicle by column 5J on the 2nd floor of FMPI.

- **Meeting between Coordinator and PEQIT.**

Once the PEQIT has assembled at the OEE, the coordinator will provide the team with whatever information, equipment, and material are available. The coordinator will attempt to obtain special identification to enter restricted areas. The coordinator will designate a team

leader for each PEQIT. A daily communication schedule will be arranged between the team leader and coordinator and between the team leader and team members. The PEQIT will divide into groups of 2 or 3 for the investigation. Preliminary assignment of routes will be given for each PEQIT group.

- **PEQIT obtains vehicles, loads vehicles and leaves for area of damage.**

Occasionally, a special route will be assigned to avoid damaged roads. In areas of heavy damage the CHP may meet and chaperone the PEQIT to the site. In especially remote areas, special cargo planes may be used to transport the PEQIT and their equipment into the area. One team should leave ASAP to begin recording damage and taking photos before demolition activities have removed seriously-damaged bridges. Contact OSC (Construction) for demolition locations and to possibly take photos of activities before PEQIT arrives at site.

- **Coordinator communicates daily with all those involved in the earthquake.**

It is the coordinator's job to provide support for the PEQIT. Thus, the Coordinator tries to keep abreast of all facts by talking to and attending meetings with Structures Maintenance, Translab, Office of Emergency Services (OES), California Geology Survey (CGS), etc. If the PEQIT has questions or needs help, it's the Coordinator's job to find a solution. The Coordinator should call the California Highway Communication Center (CHCC) and the District Director to let them know the daily location of the PEQIT.

- **PEQIT has tailgate safety meeting before going into the field.**

Every morning before going out into the field, a tailgate safety meeting must be held. The team leader should remind the investigators of potential hazards and safety procedures.

- **PEQIT performs investigation while maintaining contact with coordinator.**

Early each day the team leader calls the coordinator to discuss aspects of the investigation. The Coordinator's cellular phone, pager, and home phone number are provided in the PEQIT Roster. After talking with the coordinator, the leader meets with the members and gives each of them the day's assignment. This assignment may be to investigate an area, a route, or a specific bridge. The team should not delay the investigation if contact with the coordinator is not successful. However, in that case the leader should attempt to establish contact at a later time. A description of what should be recorded during an investigation is provided in the Appendix. Because damaged structures blocking transportation routes will be removed as quickly as possible, the investigation should continue from dawn to dusk. The PEQIT should obtain newspapers everyday for information and a possible source of photographs. If construction or maintenance personnel were able to take photos before damaged bridges were removed, the PEQIT should interview the person and get their phone number as an additional source of photos. At the end of the day, the PEQIT will meet with the leader and discuss the results of the investigation. The PEQIT members should then organize their day's notes and write down everything significant that was observed that day. The team leader should call the coordinator to review the events of the day and plan for the next day's investigation. The extent of the investigation shall be determined by the PEQIT Coordinator in consultation with the Office Chiefs of the PEQIT members.

- **Coordinator posts daily updates on the Internet**

As road conditions and bridge performance become known, the coordinator will write summaries and post them on the OEE Website.

http://www.dot.ca.gov/hq/esc/earthquake_engineering/damage_report/EarthquakeNotice.pdf

If the PEQIT has access to digital cameras, laptop computers, and modems, they should email photos, drawings, and documents to the coordinator for posting at the end of each day's investigation.

- **PEQIT returns to DES and provides digital or hard copies of all photos with labels describing important features.**

A digital copy (compact disk, memory card, etc.) or at least five prints of all photographs should be made. All photos should be labeled as thoroughly as possible with the bridge name, number, bridge member, and a brief description of important features. The master set of photos should include where the photo should be placed in the report.

- **PEQIT provides a completed report (hard copy and compact disk) to coordinator and returns to normal duties.**

The Coordinator will provide the PEQIT with the scope and direction of the report as directed by the OEE Chief. The contents of a typical PEQIT report are provided on page 8 of this manual. All team members are expected to participate in this process and complete their assignment before returning to normal duties.

- **Coordinator edits report and gives draft to OEE and SD Chiefs for review.**

Coordinator edits the report for grammar and content. Coordinator adds sections by the OEE seismologist (and by geotechnical, underground structure, retaining structure, and other specialists when appropriate). Coordinator adds an introduction and conclusion and sends to OEE and SD Chiefs for review.

- **Coordinator takes OEE and SD Chiefs comments and recommendations, makes final draft of report, and sends to reprographics for publication.**

Coordinator will normally give OEE and SD Chiefs one week to review the report. Coordinator and OEE Chief may discuss the number of copies, the type of binding, whether color or black and white figures should be used, etc. The final draft should be converted to a PDF file and checked for errors before sending to reprographics.

- **Coordinator writes a summary of the report for inclusion in the Caltrans OEE Internet Site.**

The daily summaries on the OEE Website will be replaced by a summary of the completed report.

- **Coordinator distributes published PEQIT Report.**

After publication, the Coordinator provides copies of the report to the PEQIT, to the DES, SD and OEE chiefs, to the Seismic Advisory Board (SAB), to Technical Publications, the Technical Resource Center, and the HQ Library, and gives the "original" and any remaining copies to the DES publications unit for general distribution. Normally, the copies remaining after the general distribution are sent to the Document Center by the DES publications unit for sale to the public.

✓	<u>COORDINATOR'S CHECKLIST</u>
	Monitor reports and make a rough estimate of extent of highway/bridge damage.
	Call a sufficient number of engineers from the roster and select a team leader.
	Round up and write down equipment to be used by PEQIT

	Call Structures Maintenance to coordinate lodging and transportation.
	Call airlines, rental agencies, garages, etc to arrange transport into area of damage.
	Continue monitoring reports to determine areas of damage.
	Obtain maps, bridge logs, and bridge plans for investigators.
	Meeting w/ team to plan investigation and arrange communication.
	PEQIT leaves for area of investigation.
	Coordinator obtains info & communicates daily with PEQIT.
	Coordinator provides updates for the OEE Website
	PEQIT returns from investigation.
	Coordinator organizes the writing of the PEQIT report.
	Coordinator edits the PEQIT report.
	Coordinator sends report for final review by OEE and SD Chiefs.
	Coordinator makes relevant changes and sends report to reprographics.
	Coordinator provides summary of report for the OEE Website
	Coordinator distributes published report.

WRITING A PEQIT REPORT

- **Binding and Cover should use District Color**

District 1: White	District 7: Dark Green
District 2: Ivory	District 8: Red
District 3: Gray	District 9: Dark Blue
District 4: Orange	District 10: Light Green
District 5: Brown	District 11: Yellow
District 6: Light Blue	District 12: Goldenrod

- **Contents**

Title Page**Acknowledgments**

The PEQIT report depends on the efforts of many people. Those individuals who went out of their way to make the investigation and report a success should be acknowledged in this section.

Table of Contents**Seismological Data**

Only the most essential data should be included in this section. This would include the magnitude, the rupture location and direction, the type of fault, whether the rupture broke the surface, strong motion record information, and comments with reference to Caltrans seismic hazard map.

Geological Data

A general description of the geology, soil characteristics, and fault system in the area of bridge damage. Any unusual conditions should be recorded.

Geographical Data

The topography, location of bays, lakes, and rivers, and other geographical conditions that have a bearing on the performance of bridges for the earthquake.

Summary

This section should typify the performance of bridges and highway structures due to this earthquake. The damage severity should be documented in terms of local and global categories.

Collapse**Major Damage****Moderate Damage****Minor Damage****No Damage****Performance of Retrofits****Performance of Post-1980 Bridges****Performance of Post 1990 Bridges****Performance of other Highway Structures****Design Recommendations****Conclusions****Appendices**

RESOURCES

EARTHQUAKE INFORMATION CLEARINGHOUSE

The California Geological Survey (CGS) currently is in charge of establishing an Earthquake Investigation Clearinghouse (EIC) in order to provide a convenient, on-site means for coordination of immediate post-earthquake investigations. The CGS will establish an office in the field near the scene of any damaging earthquake in California and operate it in cooperation with the Earthquake Engineering Research Institute (EERI), the California Office of Emergency Services (OES), the Federal Emergency Management Agency (FEMA), and many other organizations. The Caltrans-Structures Post-Earthquake Investigation Team (PEQIT) shall work in close cooperation with the EIC.

The EIC will maintain a register of authorized investigators at the scene showing organizations represented, field of expertise, location of activity, field address and phone numbers. The EIC will provide a large-scale situation map on which will be plotted areas of damage, areas of hazard, and other details of geologic and engineering concern. An EIC information coordinator will conduct news media briefings and prepare appropriate news releases.

The EIC operation will include at least one information exchange meeting of all interested groups. This meeting is to be held the first evening after the event, if feasible, either at the EIC facility, if space is available, or at an alternate location to be announced by CGS. Currently, Jaro Simek is assigned to represent Caltrans at the EIC.

The location of the EIC will be established as soon after a damaging event as physically possible, ideally within a few hours. Notification of the location will be provided by Bill Bryant. His email is bbryant@consrv.ca.gov and his phone number is 916 323-9672.

CALTRANS' EMERGENCY PLANNING SECTION

In the event of a disaster involving highways, Caltrans' Emergency Planning Section will coordinate all of Caltrans' operations with the California Highway Patrol, the Office of Emergency Services, the National Guard, the Bureau of Aeronautics, and other Federal, State and Local agencies. Although the PEQIT is primarily interested in studying how Caltrans seismic criteria is reflected in bridge performance during earthquakes in contrast with the emergency operations of other agencies, our team may be able to obtain assistance in transportation, communications and information gathering through Len Nelson (654-6723) or John Cottier at 654-3102. The existence and location of our team should be made known by contacting the Caltrans Highway Communications Center at (916) 653-3442 or ATSS 8-464-3442.

ACCOUNTING

- Time Sheets
Charge District 59-() / Source (your source)
Expense Authorization 910076 / Activity 2003
- Travel Expense Authorizations (TEC's)
Team members are expected to handle their own financial arrangements. Reimbursement is made by submitting a Travel Expense Claim (TEC) with appropriate receipts. Refer to the current Caltrans' "Pocket Travel Guide" for more information.

AUTOS

1. State cars are available from the State Garage at 1416 Tenth Street in Sacramento. Call 657-2327 to make a reservation. Their hours are Monday to Friday, from 7:00 AM to 7:00 PM. (returns are 6:00 AM to 9:00 PM). A General Services Charge Card is required.
2. The Department of General Services has contracts with Alamo, Budget, and Enterprise. You may have to use your own credit card to rent cars from other rental agencies. It is preferable to go through Navigant Travel to rent a car (as well as to obtain an airplane reservation or a hotel room). **After hours or on weekends Navigant Travel can be reached at 1-877-409-5862 (Code S6NFA).** PEQIT members should contact the TEC Unit at 227-9061 with any questions about arranging travel.
3. Vehicles may be obtained from Donna Roberts at Local Assistance (227-3330) or from Frances Banda at Preliminary Investigations (227-8164). It may also be possible to borrow a vehicle from Structures Maintenance (227-8843) or from the Mechanical and Electrical Sections (227-8337).
4. Translab has radio cars and other specialty vehicles not available from the State Garage. Contact Keenie Calahan at Material and Engineering Testing Services at 227-7020.
5. Vehicles can possibly be obtained through Len Nelson (654-6723), John Cottier (654-3102), or Terry Rogers (643-8852) at Caltrans Headquarters Office of Emergency Management.
6. Although their vehicles may be in use, Roy Bibbens at 227-7178 (Geotechnical Services North), John Ehsan at 227-4575 (Geotechnical Services South 1), Abbas Abghari at 227-7172 (Geotechnical Services South 2), and Henry Brimhall at 227-4475 (Foundation Drilling) may be contacted to see if an extra vehicle is available.
7. Personal Autos. State cars should be used, if possible, to facilitate entry into restricted areas. Use the 12" x 12" magnetic Caltrans door signs on private or rental cars. Do not drive autos while magnetic signs are attached (they blow off). The Coordinator has one sign and more can be obtained from the Translab or from your supply clerk.
8. If available, a District car equipped with a District radio (and an AM/FM radio) is preferred (see District phone numbers on Page 16 and District radio channels on Page 13).

AIR TRAVEL

Airline tickets can be obtained through the usual channels during regular working hours. On weekends or after hours, PEQIT team members should call Navigant Travel at the **1-877-409-5862 (Code S6NFA)**. If Navigant for some reason is not available, the PEQIT could possibly use their own money or credit cards for airline tickets and be reimbursed.

Under some circumstances it may be possible to get transportation by the CHP, Bureau of Aeronautics or from other sources. If the need arises, contact Caltrans' Emergency Management Coordinator John Cottier at 654-3102 or his assistant, Len Nelson at 654-6723.

The Division of Aeronautics will supply air transportation only for severe emergencies and usually only for the CALTRANS Director. If a disaster situation arises, it may be possible to secure space for one additional person.

EQUIPMENT

The following is a list of useful equipment for a post earthquake investigation. Some of it is supplied by the PEQIT Coordinator but much of it needs to be brought by the members.

Essential Equipment	Additional Equipment
Hard hat and orange vest	Coveralls

Magnetic placards	Rock Hammer
Log of Bridges on State Highways	Maps
Notebook to record observations.	Bridge Plans
Camera and film	Radio
Tape measure	Binoculars
Food	Tape Recorder
Water	Walkie-talkies
Boots	Aerial Photos of site
Rugged clothing and rain gear	As Built Bridge Plans

Identification Badges

Each team member should carry a Caltrans Emergency Pass if they are available. At a minimum, the Caltrans Employee ID can be used to obtain access to heavily damaged structures. Magnetic Caltrans signs should be attached to auto doors unless autos with permanent signs are used. Remember not to attempt driving with magnetic signs as they will blow off. Areas of damage are likely to be guarded by police or CHP. Some form of identification is necessary to be admitted into these areas. The Office of Emergency Services provides photo ID's for engineers taking the 1/2 day seminar. However, OES workers are issued special colored passes that change for every event.

Clothing

Each person is responsible for furnishing their own hard hat, boots or shoes with heavy soles, and suitable clothing. Nailproof inserts are recommended for shoes. Take raingear during the rainy season. Bring cold weather gear for earthquakes in the mountains or near a bay or ocean.

Communication Equipment

- Cellular Phones**

The PEQIT Coordinator has three cellular phones. They should work well in most areas of California. If you are not transmitting, try moving a few hundred yards away and try again. These digital phones have chargers that should be taken when you anticipate being gone for several days. If you have trouble using a cell phone contact Steven Halsey at 227-8989.

Cellular Phone Numbers	Manufacturer
916-730-0580	Nextel
916-417-5055	Nextel
916-947-9649	Nextel

- Pagers**

The PEQIT Coordinator has four MobileComm pagers. These pagers will display the caller's phone number, or they can be used to receive an email message. Simply type the address <http://www.mobilecomm.com/message/> on the Internet address bar and type the phone number and your message on the Arch Wireless screen that appears. The same message will appear on the pager. For more information, on pagers or cell phones contact Steven Halsey at 227-8989.

Pager Phone Numbers	PIN
916-592-7629	0104617
916-592-1298	0104619
916-592-2191	0103185
916-592-2862	0104616

- Caltrans Radio**

The PEQIT Coordinator has a MTS 2000 portable radio. This radio can be used to contact District Dispatchers and Caltrans' vehicles equipped with radios. The radio can be used to monitor District communication for information on bridge damage and to establish contact when other communication facilities are damaged. The radio comes with an operating instruction

manual and a charger. The radio should be set to the correct District and Channel using the selector knob. Then the switch on the side is pushed to begin communications. The radio can be set to monitor conversations in the area or on a direct setting to speak with another radio operator. The following Settings are for Caltrans repeater stations in California.

- TURN RADIO ON WITH THE VOLUME CONTROL KNOB
- 16 POSITION ROTARY KNOB SELECTS DISTRICT 1, POSITION 1, ETC.
- TO CHANGE CHANNELS:
 1. PRESS (>)
 2. PRESS BUTTON (1) UNDER MENU DISPLAY 'CHAN'
 3. PRESS (>) OR (<) TO SELECT A DESIRED CHANNEL OR ENTER CHANNEL NUMBER ON THE KEY PAD.
 4. PRESS (HOME)
- TO SELECT DIRECT OR REPEATER MODE OF OPERATION:
 1. PRESS (>)
 2. PRESS BUTTON (2) UNDER MENU DISPLAY 'DIR'
 3. PRESS BUTTON (1) FOR 'DIRECT' OR BUTTON (3) FOR 'REPEATER'
 4. '→' IN THE DISPLAY INDICATES DIRECT
- TO TURN SCAN 'ON' OR 'OFF':
 1. PRESS (>)
 2. PRESS BUTTON (3) UNDER MENU DISPLAY 'SCAN'
 3. PRESS BUTTON (1) UNDER MENU DISPLAY 'ON' OR PRESS (3) UNDER MENU DISPLAY 'OFF'
 4. DISPLAY 'Z' INDICATES RADIO IS SCANNING
 5. NOTE: CH. 1 IN EACH DISTRICT LIST IS A FIXED SCAN LIST
- TO VIEW A SCAN LIST:
 1. PRESS (>) TWO TIMES
 2. PRESS BUTTON (1) UNDER MENU DISPLAY 'VIEW'
 3. PRESS BUTTON (1) UNDER MENU DISPLAY 'SCAN'
 4. 'Z □' INDICATES RADIO IS IN THE SCAN LIST VIEW MODE
 5. PRESS (>) OR (<) TO VIEW THE CHANNELS THAT ARE CURRENTLY IN THE SCAN LIST
 6. PRESS (HOME) TO EXIT VIEW MODE
- TO EDIT A SCAN LIST:
 1. PRESS (>) TWO TIMES
 2. PRESS (2) UNDER MENU DISPLAY 'PROG'
 3. PRESS (1) UNDER MENU DISPLAY 'SCAN'
 4. FLASHING '□' INDICATES RADIO IS IN THE SCAN LIST EDIT MODE
 5. PRESS (<) OR (>) TO ADD OR DELETE THE CHANNEL FROM THE SCAN LIST
 6. PRESS THE BLUE/GREEN BUTTON ON THE LEFT SIDE OF THE RADIO TO ADD OR DELETE THE CHANNEL FROM THE SCAN LIST
 7. 'Z' INDICATES THE CHANNEL IS IN THE SCAN LIST
 8. SCAN LIST CAN INCLUDE UP TO TEN CHANNELS
 9. PRESS 'HOME' TO EXIT EDIT MODE

District Channels for Caltrans Radio

DIST	CH. NO. & NAME	DIST	CH. NO. & NAME	DIST	CH. NO. & NAME	DIST	CH. NO. & NAME
1	1-01 C/C SCAN *	2	1-02 C/C SCAN*	5	1-05 C/C SCAN'	6	1-06 C/C SCAN'
1	2-SR 199W	2	2-DORRIS	5	2-FREEMONT PK	6	2-MADERA
1	3-CRESCENT CITY	2	3-SEIAD	5	3-MONTEREY	6	3-COURSEGOLD
1	4-KLAMATH	2	4-GAZELLE	5	4-CARMEL	6	4-HUNTINGTON I-AK
1	5-ORLEANS	2	5-EAGLE LAKE	5	5-LITTLE RIVER	6	5-AUBERRY
1	8-SR 299 W	2	8-MC CLOUD	5	6-KING CITY	8	6-5R 180
1	7-EUREKA	2	1-BUCK HORN	5	7-SAN SIMEON	6	7-VISALIA
1	8-SCOTIA	2	8-HAYFORK	5	8-CAMBRIA	6	8-SR 178
1	9-GARBERVILLE	2	9-PLATINA	5	9-SAN LUIS	6	9-SR 58
1	10-LONGVALE	2	10-RED BLUFF	5	10-SAN LUIS MS	6	1 0-MARICOPA
1	11-UKIAH NORTH	2	11-COLBY	5	11-SANTA MARIA	6	1 1-BAKERSFIELD
1	12-NAVARRO	2	12-ST JOHNS	5	12-SANTA BARBARA	6	1 2-FRESNO
1	13-BOONVILLE			5	13-SANTA BARB MS	6	1-ONST GI
1	14-UKIAH SOUTH			5	14-BIG BASIN	6	14-CONST G2
1	15-CLEAR LAKE						
				7	1-C/C SCAN'	8	1-C/C SCAN'
3	1-03 C/C SCAN'	4	1-04 C/C SCAN'	7	2-GRAPEVINE	8	2-INDIO
3	2-115 NORTH	4	2-SANTA ROSA	7	3-GORMAN	8	3-CABAZON
3	3-OROVILLE	4	3-BERRYESA	7	4-PALM DALE	8	4-BOX SPRINGS
3	4-CHICO	4	4-NAPA	7	5-I 5/SR 14	8	5-JOHNSTONE
3	5-CHICO NORTH	4	5-FAIRFIELD	7	6-BURBANK	8	6-CAJON PASS
3	6-WOODLAND	4	8-SAN RAFEL	7	7-SAN DIMAS	8	7-VICTORVILLE
3	7-SACTO LOCAL	4	7-OAKLAND	7	8-POMONA	8	8-BARSTOW
3	8-SOUTH SACTO	4	8-WALNUT CRK	7	9-TORRANCE	8	9-TEMECULA
3	9-PLACERVILLE	4	9-PLEASANTON	7	10-WEST LAKE	8	10-BIG BEAR
3	1 ~STOCKTON	4	1-ALTAMONT PS	7	11-SANTA PAULA		
3	11 -KYBURZ	4	1 1-BENICIA TOW	7	12-VENTURA		
3	12-ECHO/ SLTAHOE	4	12-NILES CANYON	7	13-OJAI	10	1-C/C SCAN'
3	13-AUB/MARYSV L	4	13-SAN FRANCISC	7	14-MALIBU	10	2-CABBAGE PATCH
3	14-NEV CITY/I 80	4	14-HALFMOON BAY	9	1-C/C SCAN'	10	3-TELEGRAPH
3	1 5-BAXTER	4	15-HWY 92135	9	2-TOPAZ	10	4-PEDDLER HILL
3	16-WHIT/KINGVALE	4	16-LA HONDA	9	3-HOT SPRINGS	10	5-MT BUWON
3	17-KINGVALE/TRKE	4	17-PIGEON PT	9	4-MONO LAKE	10	6-MT OSO
3	18-TRUCKEE	4	18-SAN JOSE	9	~REST VIEW	10	7-LEVIATHON
3	19-BOCA/RENO	4	19-HECKER PASS	9	6-BISHOP	10	8-MT ZION
3	2~TRKI//TAHOE CITY	4	2-PACHECO PASS	9	7-LONE PINE		
3	21-TAHOE			9	8-RIDGE CREST		
3	22-NEV CITY			9	9-MOJAVE	12	1-C/C SCAN*
3	23-CAL IDA			9	10-TEHACHAPI	12	2-SANTA ANA COM
3	24-DOWNIEVILLE			9	11-LITTLE CREEK	12	3-ORANGE
3	25-SIERRA CITY			11	1-C/C SCAN*	12	4-BREA
3	26-YUBA PASS			11	2-ESCONDIDO	12	5-SAN JUAN
3	27-SIERRAVILLE			11	3-METRO	12	6-REGION 2
3	28-RED BLUFF			11	4-EL CAJON	12	7-YORBA LINDA
3	29-PU LGA			11	5-EL CENTRO	12	8-WESTMINSTER

*CHANNELS LABELED [C/C SCAN] ARE CAR TO CAR CHANNELS WITH FIXED SCAN LISTS. SCAN FEATURE MUST BE ACTIVATED VIA THE MENU.

- **Two-Way Radios**

We have a pair of 'walkie-talkies' that can be strapped to the investigators clothing for hands-free operation. These can be used for rope climbing or when traffic noise makes conversation impossible. The main unit is hung from a belt and the microphone clipped to a shirt collar. We also have a newer pair of 'walkie-talkies' that are smaller but don't provide hands-free operation.

Tape Recorders

Currently, the PEQIT Coordinator has one Olympus Microcassette recorder. It comes with 10 blank tapes and a supply of AA batteries. PEQIT members should either become familiar with using the tape recorder or bring a stenographer's pad to take their notes.

Cameras And Film

Currently, the PEQIT Coordinator has five digital cameras of varying quality. We also have two Olympus OM-1 single lens reflex film cameras. Members of the PEQIT should either bring their own cameras or practice taking pictures with the PEQIT cameras, particularly for taking pictures in shadow when there is bright background light. This is too often the case when photographing under bridges. Some cameras have a 2X setting to compensate for bright backgrounds. Usually focusing on the dark area will set the aperture and shutter speed for the area of darkness. Familiarity with the camera is essential for clear pictures. Bring lots of film or memory cards. It is not unusual to shoot 5 or 6 rolls of film every day. Film can be obtained from the supply room or it can be purchased.

The Olympus digital cameras come with 4 Mb and 8 Mb smart media cards. The older Sony cameras use 128 Mb memory sticks and the newest camera has 2 – GB memory sticks. A single photo can use as much as 5Mb (in high resolution) or as little as 200 Kb (in the lowest setting). Digital photos must either be downloaded to a computer with the appropriate camera software or to a computer with the appropriate card reader.

Digital cameras come with lithium batteries, chargers, AC adapters, connection cables, and manuals. Investigators should not take the digital cameras unless they are familiar with their operation. The use of laptops with modems and digital cameras will allow the PEQIT to send the coordinator photos from the field, which can then be put on the Internet to update the public.

It is essential that investigators take the time to identify each photo as it is taken. Labels can be made in ‘Word for Windows’ and affixed to the back of the photos. Investigators are encouraged to study the labeling system used after the Northridge earthquake. These are available from the coordinator.

Bridges Plans

The following steps can be used to obtain bridge plans in the field:

- 1) Access the Caltrans network through a Caltrans computer or from an outside computer with a modem by dialing 1-800-561-1553 and logging on with *username.es.fmp1.sac.caltrans* and your Novell Network password.
- 2) Navigate to *smi.dot.ca.gov*
- 3) Click on the BIRIS link.

The software will prompt the user for any needed plug-ins. Paul Cooley (227-8827) manages BIRIS and can assign staff to help with the investigation.

Maps

The best maps for locating state bridges are the California State Highway Maps that have post-miles corresponding to the bridge logs. The best maps for locating local bridges are the county township and range maps that show every street and local bridge. The Coordinator has a complete set of these county maps under his desk. The PEQIT Coordinator also has a complete set of AAA maps for the state of California. To preserve these maps, they should be ‘Xeroxed’ and the copies should be taken out into the field.

The PEQIT Coordinator also has ARC-VIEW GIS software installed for locating faults and creating lists of bridges for investigation. Most mapping software (such as “Delorme Street Atlas”) can take a text file of Caltrans bridge latitude and longitudes and overlay it onto a map of California. The investigator can then zoom in on the area to locate state and local bridges.

Aerial Photographs

Aerial photos of earthquakes that cause vehicle damage or loss of life on state highways are usually taken by aerial photography firms under contract to Caltrans within 24 hours of the event.

To obtain aerial photos of earthquake damage, call 'Photogrammetry' under Contacts or check at the following website: <http://www.dot.ca.gov/hq/esc/photogrammetry/contacts.html>

Water

Potable water may be difficult to obtain. Consider buying one or more plastic folding type containers or canvas waterbags. Large, rigid plastic type containers may be available near the destination in some cases. Individual members should consider bringing their own filled canteens or water bottles.

Food

Consider taking a sack lunch when you leave Sacramento. If restaurants and grocery stores are severely damaged or cannot operate due to lack of water and power, obtain canned and dehydrated foods and canned juices before you enter the area.

PEQIT EQUIPMENT

Quantity	Description	Model No.	Location
3	Nextel Cellular Phones w/ chargers, etc.	I530	Cabinet
4	Motorola Pagers	A05MVB5861AA	Cabinet
2	ICOM Two Way Radios	IC-F4-4	Cabinet
2	Garmin Walkie-Talkies / GPS Receivers	Rino 120	Cabinet
1	Motorola Portable Radio	MTS2000	Cabinet
2	Olympus Digital Cameras	D-600L	Cabinet
2	Sony Digital Cameras	DSC-F707 & Mavica	Cabinet
1	Sony 7.7 Megapixel Digital Camera	DSC-P200	Cabinet
-	Memory Sticks, Flash Memory, etc.		Cabinet
2	Olympus 35mm Film Cameras	OM-1	Cabinet
-	Print and Slide Film		Cabinet
1	Camera Bag Containing Lenses and Flash		Cabinet
1	Olympus Microcassette Recorder and Tapes	Pearlcorder S710	Cabinet
1	Toshiba Tecra running Win2000		Cabinet
1	Panasonic Toughbook running XP Pro	CF-51	Cabinet
3	Binoculars		Cabinet
-	Batteries		Cabinet
1	Envelope of Keys		Drawer
1	Bandages and First Aid Kit		Drawer
1	100' Tape Measure		Drawer
-	Replacement Locks & Bag of Caltrans Keys	12B130	Drawer
1	Magnetic Caltrans Auto Decals	20M1543	Drawer
-	AAA Maps		Drawer
-	Bridge Logs and District Maps		Drawer
1	Hacksaw and Replacement Blade		Closet
-	Hard Hats, Orange Vests, and Coveralls		Closet
3	Flashlights		Closet
1	Pick		Closet
1	Plumb Bob		Closet
3	Tape Measures		Closet
1	Bolt Cutters		Closet
3	Suitcases		Closet
5	Canvas Tote Bags with a variety of equipment		Closet
1	Blue General Services Card		Coordinator

MAKING CONTACT

Contact the Coordinator when you arrive at your location (i.e., at the airport or at the EQ site) for an update on the damage. The team leader will notify the District Director that a Structures team will be in his/her district to gather technical information. Give names of team members and name of motel - if known. If you have a Caltrans radio, notify the District Communications dispatcher when you enter or leave the District (use the District Headquarters as the call number; i.e., "San Francisco," "Marysville," etc.). The PEQIT can use the following call number for its use: 59-(last name of team leader)." District offices can relay messages to and from Sacramento via radios on Caltrans frequencies. Caltrans and the CHP monitor each other's frequencies.

Transportation Districts (Coordinator has list of weekly duty officer for each district)	
District 1 1656 Union St., Eureka (95501)	Traffic Management/Dispatcher
Public Info. (707) 445-6600 (8-538-6600)	8-538-6386 (707-445-6386)
District 2 1657 Riverside Dr. , Redding	
Public Info. (530) 225-3426 (8-442-3426)	8-442-3273 (530-225-3273)
District 3 703 B St., Marysville (95901)	
Public Info. (916) 741-4211 (8-457-4211)	8-457-7900 (916-859-7900)
District 4 111 Grand Avenue, Oakland (94612)	
Public Info. (415) 286-4444 (8-541-4444)	8-541-6359 (510-286-6359)
District 5 50 Higuera St. , San Luis Obispo (93401)	
Public Info. (805) 549-3111 (8-629-3111)	8-629-3212 (805-549-3111)
District 6 1352 W. Olive Avenue, Fresno (93728)	
Public Info. (559) 488-4020 (8-422-4020)	8-422-4152 (559-488-4152)
District 7 100 S. Main St., Los Angeles (90012)	
Public Info. (213) 897-3656 (8-647-3656)	8-647-0383 (213-897-0383)
District 8 247 W. Third St., San Bernardino (92402)	
Public Info. (909) 383-4561 (8-670-4561)	8-670-7503 (909-383-4561)
District 9 500 S. Main St., Bishop (93514)	
Public Info. (760) 872-0601 (8-627-0601)	8-627-0718 (760-872-0718)
District10 1976 East Charter Way, Stockton (95205)	
Public Info. (209) 948-7543 (8-423-7543)	8-423-7556 (209-948-7556)
District11 2829 Juan St., San Diego (92110)	
Public Info. (619) 688-6699 (8-688-6699)	858-467-3085 -858-467-3090
District12 2501 Pullman Street, Santa Ana (92705)	
Public Info. (714) 724-2000 (8-655-2000)	8-655-2607 (714-724-2607)

TECHNICAL SUPPORT	
Pat Hipley Bridge Instrumentation	Pager 916-592-1939 (885092)
Steven Sahs is the OSMI Seismic Specialist	Cell Phone 916-804-0603
Lalliana Mualchin Caltrans' Seismologist	Home 916-622-6016
Abbas Abghari Geotechnical Engineering Chief	Office 916-227-7172
Dallas Forester Underground Structures	Office 916-227-8674
Overcomer Hor Earth Retaining Structures	Office 916-227-8482
Tim Delis Bridge Bearings	Office 916-227-315
Eric Tavenier provides Internet Support	916-227-4114
George Williford Safety Officer	916-227-9548
Ke Zhou GIS	916-227-2624
Martha Merriam Geologist	916-227-7221

Caltrans Management and Emergency Support**Robert Buckley** is the Director of the ESC

Office 916-227-8800

Cell Phone 916-801-5397

Dan Thomas is the Director's Assistant

Office 916-227-9848

Kevin Thompson is the Deputy Chief Structure Design

Office 916-227-8807

Cell Phone 916-825-5971

Dolores Valls is the SC Chief

Office 916-227-8845

Home 707-678-1106

Rob Stott is the SDS&EE Chief

Office 916-653-4686

Cell Phone 916-240-3798

Mike Keever is the OEE Chief

Office 916-227-8806

Home 530-621-2741

John Cottier is the Caltrans Emergency Coordinator

Office 916-654-3102

Cell Phone 916-416-8611

Len Nelson is the Assistant Emergency Coordinator

Office 916-654-6723

Cell Phone 916-997-8054

California Highway Communication Center

Phone Number 653-3442

IMPORTANT WEB SITES

Shake Map	http://pasadena.wr.usgs.gov/latest/shakingmaps.html
Recent World Earthquakes/USGS/NEIC	http://wwwneic.cr.usgs.gov/neis/bulletin/bulletin.html
Recent Earthquakes California & Nevada	http://quake.wr.usgs.gov/recenteqs/
U.S.G.S. Strong Motion Program	http://agram.wr.usgs.gov
Caltech Seismological Laboratory	http://www.seismolab.caltech.edu/
University at Nevada Reno Seismic Lab	http://www.seismo.unr.edu/
Strong Motion Data Center	http://docinet3.consrv.ca.gov/csmip/
TriNet Shake Maps	http://www.trinet.org/
Download Bridge Motions from CDMG	ftp://ftp.consrv.ca.gov/pub/dmg/csmip/BridgeData/
COSMOS Strong-Motion Observations	http://www.cosmos-eq.org/SiteMap.html
Earthquake Information Network	http://www.eqnet.org/index.asp
Southern California Earthquake Data Center (SCEC)	http://www.data.scec.org/catalog_search/index.html
Advanced National Seismic System	http://www.anss.org/
Engineering Strong Motion Data Center (CISN)	http://www.quake.ca.gov/cisn-edc/

Office of Photogrammetry - Public Information

916-227-7680

Office of Photogrammetry - Fax

916-227-7670

James Appleton, Office Chief

916-227-7656

Jerold Peterson, Project Manager

916-227-7654

David L. Brubaker, Chief - Contracts & Aero-Triangulation Branch

916-227-7642

Lawrence Dews, Chief - Internal Production and Quality Branch

916-227-5917

Dave Fredrickson, Chief - Digital Terrain Data Branch

916-227-5757

Scott Rodrick, Technology Integration Specialist and A&E Task Manager

916-227-7672

Don Ivy, Acting Project Management

916-227-2695

District Photo-Coordinators

District 1 - Jack Fawcett

(707) 445-6513

District 2 - Tracie Compomizzo

(530) 225-3178

District 3 - Donald Vaughan

(530) 634-7670

District 4 - Peter Donohoe

(510) 286-4952

District 5 - Tom Ryan

(805) 549-3222

District 6 - Howard Brunetti

(559) 243-8604

District 7 - Phillip Rushton

(213) 897-0464

District 8 - Denise McGuire

(909) 383-7943

District 9 - Ken Maliszewski

(760) 872-0653

District 10 - Craig Diederich

(209) 948-7973

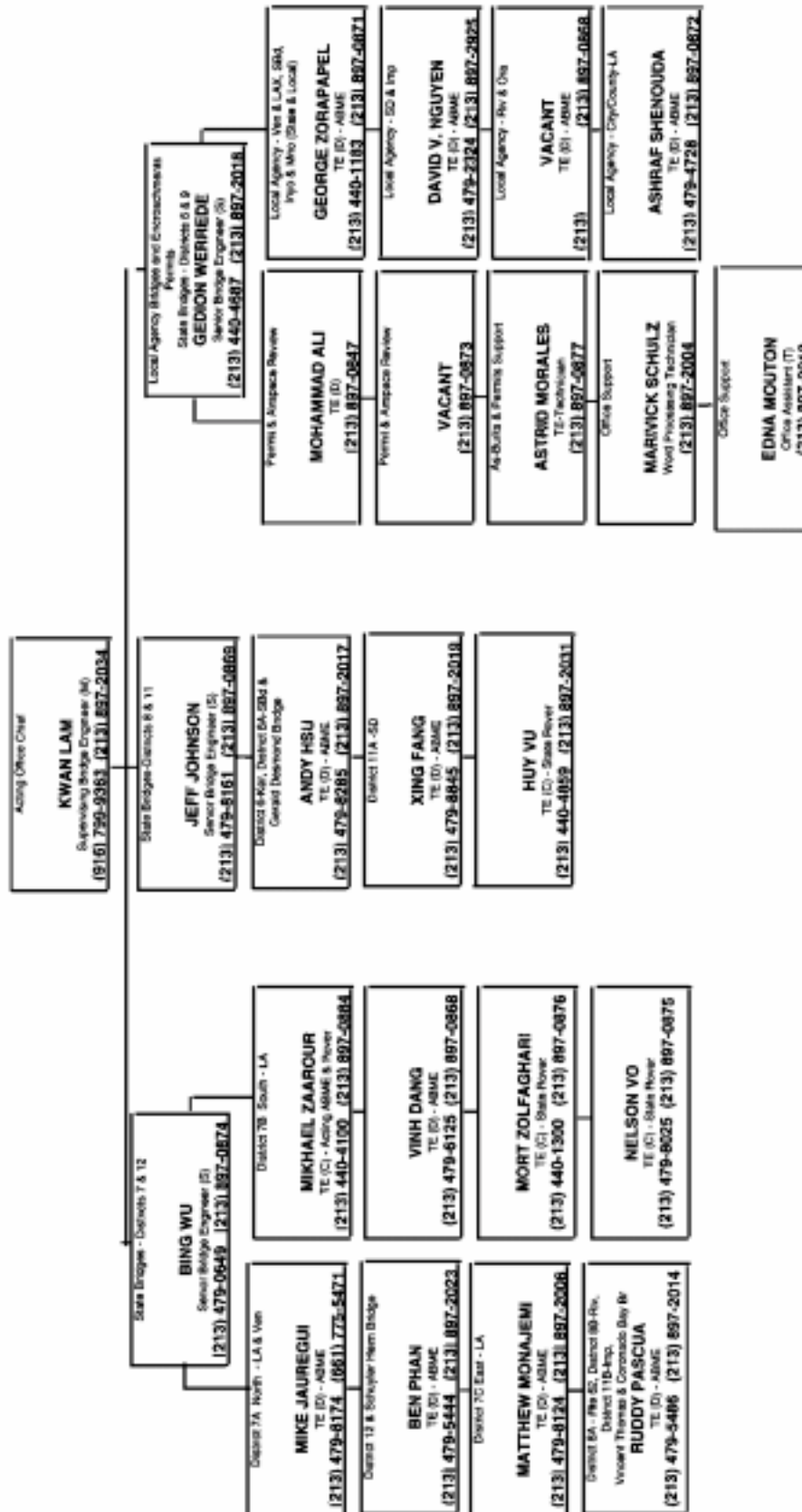
District 11 - Bob Hayden

(619) 688-6608

District 12 - Tony Behnke

(949) 724-2502

DIVISION OF MAINTENANCE
OFFICE OF STRUCTURE MAINTENANCE AND INVESTIGATIONS (SOUTH)
 100 S. Main Street (3rd Floor), Los Angeles, CA 90012



ORGANIZATION CHART

DIVISION OF MAINTENANCE
OFFICE OF STRUCTURE MAINTENANCE & INVESTIGATIONS
Kenneth Brown, Office Chief - Toll Bridge Investigations
Unit 623

111 Grand Ave.
Rm. 10-400, MS17
Oakland, CA 94612
FAX (510) 236-0288

As Of: March 28, 2005



Structure Construction Managers and Supervisors List

<u>Name</u>	<u>ACM/ BCE</u>	<u>Area</u>	<u>Unit</u>	<u>District</u>	<u>Office Address</u>	<u>Office Phone</u>	<u>Cell Phone</u>
TOLEN, GARRY	BCE	A	502	District 01	5065 Boyd Road, Suite B Arcata, CA 95521	(707) 852-4892	(707) 498-4009
FEREIRA, N. SONNY	BCE	A	503	District 02	3881 Benetar Way, Suite C Chico, CA 959287171	(530) 949-2529	(530) 949-2529
NEWELL, LOREN	BCE	A	504	District 03	11323 SANDERS DRIVE Rancho Cordova, CA 95742	(916) 255-1094	(916) 801-6977
KEIM, DAVID	BCE	A	505	District 03	10960 West River Street, Suite 101A Truckee, CA 96161	(530) 587-0696	(530) 320-6473
HARVEY, STEVEN	BCE	A	506	District 03	2060 3 rd Street, Suite B Oroville, CA 95965	(530) 533-4164	(530) 218-8963
ABUHAMDIEH, NICK	BCE	F	508	Dist. 04 N/E	2320 Courage Drive, Suite 106 Fairfield, CA 94533	(707) 428-2058	(707) 249-4155
RAMIREZ, IVAN	BCE	R	509	Dist. 04 (Toll)	151 Fremont Street San Francisco, CA 94105	(415) 396-9154	(510) 224-6601
ALTMAN, STEVE	ACM	O	510	OSC HQ	1801 30 th Street MS 9-2/11H Sacramento, CA 95816	(916) 227-8585	(916) 212-8585
BABCOCK, JOHN	ACM	P	511	OSC HQ	1801 30 th Street MS 9-2/11H Sacramento, CA 95816	(916) 227-8871	(916) 205-8871

BOAL, BRIAN	BCE	Q	512	Dist. 04 (Toll)	3045 Research Drive Richmond, CA 94806	(510) 262-6810	(510) 714-7074
STRYKERS, PETER	BCE	F	514	Dist. 04 (Toll)	4585 PACHECO BOULEVARD, STE. 100-A MARTINEZ, CA 94553	(510) 262-6837	(510) 714-7076
FOLEY, RICHARD	BCE	R	515	Dist. 04 (Toll)	4585 Pacheco Boulevard, Suite 200 Martinez, CA 94553	(925) 957-2012	(510) 385-7189
POWELL, ROBERT	BCE	R	516	Dist. 04 (Toll)	995 Western Drive Richmond, CA 94801	(510) 231-7827	(510) 714-7088
EL-MAHMOUD, HAZZAA	BCE	R	517	Dist. 04 (Toll)	995 Western Drive Richmond, CA 94801	(510) 231-7821	(510) 714-7072
WALTERS, JOHN	BCE	P	518	Dist. 04 (Toll)	1801 30 th Street MS 9-2/11H Sacramento, CA 95816	(916) 227-8060	(415) 420-7190
TENORIO, DAVID	BCE	R	519	District 04	4585 Pacheco Boulevard, Suite 200 Martinez, CA 94553	(925) 957-2068	(925) 766-8261
CASEY, WILLIAM	BCE	Q	520	Dist. 04 (Toll)	345 Burma Road Oakland, CA 94607	(510) 622-5103	(510) 455-1798
NEUMANN, DAVID	BCE	Q	521	Dist. 04 (Toll)	739 Wilshire Avenue Stockton, CA 95203	(209) 948-3773	(510) 224-6752
WOODS, MARK	BCE	Q	522	District 04	345 Burma Road Oakland, CA 94607	(510) 622-5107	(510) 385-6897
COOK, JAMES	BCE	F	523	District 04	4030 OCCIDENTAL ROAD BLD-A SANTA ROSA, CA 95401	(707) 576-2123	(707) 974-2571
KRESS, JEFFREY	BCE	F	524	District 04	756 West Francisco Boulevard San Rafael, CA 94901	(415) 257-3641	(510) 867-6019
LAI, GARY	BCE	Q	525	District 04	333 BURMA ROAD OAKLAND, CA 94607	(510) 286-0511	(650) 222-7520
KU, STANLEY	BCE	Q	526	Dist. 04 (Toll)	333 BURMA ROAD OAKLAND, CA 94607	(510) 286-0510	(510) 376-8234
KADDOURA, MOHAMED	BCE	F	527	District 04	1910 Olympic Boulevard, Suite 200 Walnut Creek, CA 94596	(925) 988-6917	(925) 250-5588
BATA, AMER	ACM	Q	529	Dist. 04 (Toll)	1545 Willow Street Oakland, CA 946071525	(510) 622-5110	(510) 376-8259
MORROW, RICHARD	ACM	Q	530	Dist. 04 (Toll)	333 BURMA ROAD OAKLAND, CA 94607	(510) 286-0501	(510) 774-6283
COE, DOUGLAS	ACM	Q	531	Dist. 04 (Toll)	345 Burma Road Oakland, CA 94607	(510) 622-5101	(510) 714-7079
INYANG, USEN	ACM	R	532	Dist. 04 (Toll)	995 Western Drive Richmond, CA 94801	(510) 231-7828	(510) 385-7059
AMBUEHL, DAVID	ACM	R	533	Dist. 04 (Toll)	4585 Pacheco Boulevard, Suite 200 Martinez, CA 94553	(925) 957-2017	(925) 250-5593
WHIPPLE, STEVEN	ACM	R	534	Dist. 04 (Toll)	4585 Pacheco Boulevard, Suite 200 Martinez, CA 94553	(925) 957-2150	(510) 714-7073
KLEBANOV, GIL	BCE	R	536	Dist. 04 (Toll)	280 BEALE STREET San Francisco, CA 941051902	(415) 356-6633	(510) 715-8523
AL-BASHA, WASSIM	BCE	R	537	Dist. 04 (Toll)	151 Fremont Street San Francisco, CA 94105	(415) 396-9155	(510) 867-6133
WU, DAVID	BCE	Q	538	Dist. 04 (Toll)	345 Burma Road Oakland, CA 94607	(510) 622-5104	(650) 222-7239
OSANTOWSKI, KEITH	BCE	Q	539	Dist. 04 (Toll)	345 Burma Road Oakland, CA 94607	(510) 622-5158	(510) 385-7112
TAVARES, TONY	ACM	A	540	Dist. 01, 02, & 03	379 COLUSA HWY YUBA CITY, CA 95993		

WILDER, DENNIS	ACM	B	541	Dist. 08 & 11	P.O. Box 85406 (1450 Frazee Road Suite 500, S.D. 92108) San Diego, CA 92186	(619) 688-6981	(619) 607-9062
BEAUCHAMP, MICHAEL	ACM	C	542	District 08	1746 Spruce Street Riverside, CA 92507	(951) 788-1892	(909) 841-5853
FISHER, ROY	ACM	D	543	Dist. 07 S	11229 South Woodruff Avenue Downey, CA 90241	(562) 401-3333	(310) 345-6261
BOCCHICCHIO, KENNETH	ACM	E	544	Dist. 08 & 12	15510 Rockfield Boulevard, Suite A Irvine, CA 92618	(949) 598-3578	(949) 279-8474
CRAIN, ROBERT	ACM	F	545	Dist. 04 N/E	1007 Knox Avenue San Jose, CA 95122	(408) 254-5839	(408) 591-5121
LUENA, ROBERTO	ACM	H	547	District 04	295 San Bruno San Francisco, CA 94103	(415) 703-3288	(408) 591-5123
ABERCROMBIE, JEFF	ACM	K	550	Dist 06, 09, & 10	P.O. Box 12616 (1352 West Olive Avenue) Fresno, CA 93778	(559) 444-2442	(559) 260-6742
GREY, THOMAS	BCE	H	554	District 04	295 San Bruno San Francisco, CA 94103	(415) 703-3285	(415) 720-4096
GONG, STEVE	BCE	H	556	District 04	650 Irene Street San Jose, CA 95110	(408) 277-9300	(650) 222-7208
DAIT, DANIEL	BCE	H	557	District 04	(Unknown)		
HARIZAL, MATTHEW	BCE	H	559	District 04	21030 Redwood Road Castro Valley, CA 94546	(510) 881-4025	(925) 260-5514
DRURY, JOHN	BCE	P	560	District 04	1801 30 th Street MS 9-2/11H Sacramento, CA 95816	(916) 227-8809	
POZZO, STEPHEN	BCE	K	561	District 10	611 SAN JUAN AVENUE Stockton, CA 95203	(209) 948-7206	(209) 610-8650
KENNEDY, SCOTT	BCE	K	562	District 05	P.O. Box 1434 (3230 RIVERSIDE AVENUE #130, PASO ROBLES, CA 93446) Templeton, CA 93465	(805) 226-9482	(805) 610-2729
LOW, KELVIN W.	BCE	K	563	District 06	611 SAN JUAN AVENUE Stockton, CA 95203	(209) 942-6017	
SALINAS, ENRIQUE	BCE	K	564	District 06	505 N STREET FRESNO, CA 93721	(559) 445-5883	(559) 260-4508
INAGAKI, LES	BCE	O	565	Districts 06 & 09	1801 30 th Street MS 9-2/11H Sacramento, CA 95816	(916) 227-9561	(661) 301-2675
ARDAKANIAN, MEHRAN	BCE	Q	568	Dist. 04 (Toll)	333 BURMA ROAD OAKLAND, CA 94607	(415) 288-8887	(415) 720-4005
GILLIS, JOHN	BCE	O	570		1801 30 th Street MS 9-2/11H Sacramento, CA 95816	(916) 227-8980	(916) 205-8980
ALISHAHI, HOOSHANG	BCE	D	572	District 07	13171 Telfair Avenue #101, #102 Sylmar, CA 91342	(805) 375-9247	(310) 629-8608
KIRZHNER, GUENNADY	BCE	D	573	District 07	13171 Telfair Avenue #101, #102 Sylmar, CA 91342	(818) 364-2760	(818) 262-8913
PONZI, ANDY	BCE	E	574	District 07	244 Arlington Drive Pasadena, CA 91105		(626) 255-8892
HAN, TED	BCE	D	576	District 07	2090 FERN LANE GLENDALE, CA 91208	(818) 637-2524	(818) 262-8911
BURKLE, KENNETH	BCE	D	577	District 07	11229 South Woodruff Avenue Downey, CA 90241	(562) 401-3333	(562) 254-7894
SALEH, ZOUHEIR	BCE	D	578	District 07	18730 South Wilmington Avenue #103 Rancho Dominguez, CA 90220	(310) 609-0268	(310) 345-6262

LAMMERS, JOHN	BCE	O	580	Dist 05, 06, 09 & 10	1801 30 th Street MS 9-2/11H Sacramento, CA 95816	(916) 227-8445	(916) 208-8445
KIM, JU	BCE	E	582	District 07	721 Brea Canyon Road, Suite 6 Walnut, CA 91789	(909) 598-4793	(909) 772-3583
BOCCHICCHIO, KENNETH	ACM	E	583	District 12	15510 Rockfield Boulevard, Suite A Irvine, CA 92618	(949) 598-3578	(949) 279-8474
MC COOK, ANSON	BCE	E	584	District 12	3190 J Airport Loop Drive Costa Mesa, CA 92626	(714) 751-2277	(949) 279-8469
CHAO, CHING	BCE	C	586	District 12	3474 Niki Way, Room D Riverside, CA 92507	(951) 275-9625	(951) 232-6000
CORONA, JOSE	BCE	C	587	District 08	603 South Milliken, Suite K Ontario, CA 91761	(909) 390-7612	(909) 232-3937
ENWEDO, EDWIN	BCE	C	588	District 08	1746 Spruce Street Riverside, CA 92507	(951) 788-4403	(951) 232-3883
CHAO, CHING	BCE	C	589	District 08	3474 Niki Way, Room D Riverside, CA 92507	(951) 275-9625	(951) 232-6000
POULIN, CHERYL	BCE	O	590	Dist 01, 02, 03, 07	1801 30 th Street MS 9-2/11H Sacramento, CA 95816	(916) 227-8309	(916) 616-8309
ANGHA, ESKANDAR	BCE	C	592	District 08	1746 Spruce Street Riverside, CA 92507	(951) 788-2483	(951) 830-6027
STULTZ, HENRY	BCE	C	595	District 08	222 E. MAIN STREET, STE 208 BARSTOW, CA 92311	(760) 256-5780	(951) 232-3853
DOUGHERTY, ROBERT	BCE	B	596	District 11	11803 Sorrento Valley Road, #B San Diego, CA 92121	(858) 720-2119	(856) 688-1528
NICKERSON, NANCY	BCE	B	597	District 11	817 Sweetwater Road Spring Valley, CA 91977	(619) 697-0217	(858) 688-1391
ACERO, GABRIEL	BCE	B	598	District 11	PO BOX 85406 MS-72 (13560 EVENING CREEK DRIVE (NORTH)) SAN DIEGO, CA 92128	(858) 748-4250	(858) 688-1390
YEE, STEVEN	BCE	B	599	District 11	PO BOX 85406 MS-72 (13560 EVENING CREEK DRIVE (NORTH)) SAN DIEGO, CA 92128	(858) 748-7017	(858) 688-1465
BROOK, WILLIAM	BCE	A			10190 Systems Parkway, Suite 100 Sacramento, CA 95827	(916) 255-2594	(916) 801-9675
FRANCIS, MICHAEL	BCE	D			21073 Pathfinder Road, Ste 200 Diamond Bar, CA 91765	(909) 305-1261	(909) 322-4662
LUU, ANH	BCE	F			670 Scott Creek Road Fremont, CA 94539	(510) 249-1561	(510) 867-6048
ROHRER, JON	ACM				3337 Michelson Drive, Suite 380 Irvine, CA 92612	(949) 724-2059	(949) 735-5584
WRIGHTSON, BEAU	BCE	H			280 BEALE STREET San Francisco, CA 941051902	(415) 356-6630	(510) 715-6630
ZEHNDER, JOHN	BCE	E			3337 Michelson Drive, Suite 380 Irvine, CA 92612	(714) 803-2588	(714) 803-2588

SAFETY

The PEQIT needs to be cognizant of safety while in the field. It is both the team leader's and the team members' responsibilities to ensure the safety of the PEQIT throughout the investigation. The team leader should hold a tailgate safety meeting at the start and at the end of each day. At the start of the day all possible hazards that the PEQIT might encounter should be discussed and methods to prevent injury must be formulated. At the end of the day the hazards that were encountered and whether the PEQIT can improve their response needs to be discussed. On the following pages are forms and procedures to protect worker safety in the field. These include information:

1. Information on the Emergency Notification System for Caltrans Employees
2. Procedures for Office Workers who occasionally go into the field
3. Code of Safe Work Practices
4. STD 270: Vehicle Accident Report
5. PM -S- 0110 Safety Meeting Report
6. Instructions for State Employees before they drive a car on state business
7. Approved Medical Care Facilities listed by District

The following bulleted items are directed to help the PEQIT perform their investigation safely. Be aware of the possibility of hazardous materials after an earthquake and do not approach such locations. Keep your eyes open for overturned, placarded trucks and people or animals lying unconscious along the road. The PEQIT should make use of the resources offered by the District and by the Office of Maintenance in order to conduct a safe, incident-free inspection.

- PEQIT members should take confined space training for entry into box girder bridges - particularly those carrying utilities
- To get a lane closure, contact District Maintenance Region Manager
- Consider adding air horn for lookout to use when monitoring traffic, unstable structure, or unstable earth.
- District Maintenance Equipment Manager can rent lights or other needed equipment.
- Contact the District Maintenance Hazardous Materials Officer regarding spills in or under a bridge
- Contact Maintenance Permits Office to find out about utility easements within affected bridges

OFFICE WORKER SAFETY (from Chapter 5 of Caltrans Safety Manual)
July 1996

PREPARING FOR FIELD TRIPS

- 5.20 *Trip planning*
- 5.21 *Motel, hotel, dining out, and sightseeing safety*
- 5.22 *Personal clothing*
- 5.23 *Use of seat belts and shoulder harnesses*
- 5.24 *Visiting a construction or maintenance project*

USING PERSONAL PROTECTIVE EQUIPMENT (PPE)

- 5.25 *Head protection*
- 5.26 *Eye and face protection*
- 5.27 *Warning garments (vest, shirt, or jacket)*
- 5.28 *Foot protection*

SPECIAL WORK ACTIVITIES

- 5.29 *Parking and/or stopping along highways*
- 5.30 *Using physical barriers*
- 5.31 *Using a lookout*
- 5.32 *Working in median areas*
- 5.33 *Amber warning lights*
- 5.34 *Night work*
- 5.35 *Hazardous spills*

PART 2. SAFETY AND HEALTH FOR OFFICE WORKERS WHO OCCASIONALLY TRAVEL

PREPARING FOR FIELD TRIPS

This information in this section applies to all employees, but its primary focus is for supervisors and employees who work in an office setting and because of the nature of their work assignment, occasionally or routinely travel.

OFFICE WORKER SAFETY JULY 1996

5.20 Trip planning

In preparation for a field trip (*) the supervisor shall discuss the following items with his/her employee(s) before the trip begins to:

1. Define the scope of work.
2. Identify the characteristics of the work area, facility, or highway, including such things as traffic volume, number of lanes, shoulder widths, possible sites for parking, fences, gates, etc.
3. Review the Code of Safe Work Practices (**) applicable to the work.
4. Discuss working on foot with the employee(s).
5. Assemble all safety equipment (PPE), materials, and other equipment that will be required to perform the work.
6. Arrange for transportation, remind employees to use seat belts and shoulder harnesses while in the vehicle.
7. Ensure that all materials are assembled and all potential hazards have been reviewed and discussed.
8. When arriving at the worksite, drive through the designated work area in the field to identify if any work is on-going, and meet with the supervisor in charge.

* Field trips can include visiting another building or facility.

** A Code of Safe Work Practices titled - FIELD TRIPS is included at end of this chapter.

See Chapter 11 - CODE OF SAFE WORK PRACTICES for more details.

- WORKING ON FOOT

Supervisors shall have pre-job discussions with employees to discuss hazards unique to the job assignment, the hazards associated with working-on-foot, or performing pedestrian type activities, and working near highway traffic.

Supervisors shall talk to employees to improve their awareness of the increasing incident of drug and alcohol impaired drivers on the highways, and instruct them to make periodic visual observations of moving traffic during their work activities.

**OFFICE WORKER SAFETY
JULY 1996****5.21 Motel, hotel, dining out, and sightseeing safety**

Supervisors shall also discuss information about travel status, visiting other cities, and the potential hazards associated with being in a different working environment. Discussions should include personal safety and precautions about motel/hotel safety, dining out, shopping and sightseeing.

NOTE:

National media reports continue to focus attention on employees in both the public and private sector that have become victims of assaults or other forms of violent acts while working. Many of these assaults result in serious injury or fatality, or the threat of injury. It is important that managers, supervisors, and employees are aware of the potential for violence while working and what actions can be taken when an employee is confronted with an act of violence, threat, verbal or personal harassment, or intimidation.

Although limited in information about violence in the workplace, managers, supervisors, and employees are encouraged to review Chapter 6 - WORKPLACE VIOLENCE, for information that may help them understand and/or handle a situation that they may encounter while on travel status.

5.22 Personal clothing

Employees are expected to report to work reasonably dressed to protect themselves during routine assignments and from exposure to usual and/or predictable physical and environmental conditions found in the work place.

Employees shall be given adequate advance notice of field trips so they may properly dress to protect themselves during the new work assignment, and/or be protected from exposure to the conditions in the new assignment.

5.23 Use of seat belts and shoulder harnesses

It is Departmental policy that whenever an employee operates a state-owned, privately-owned, or rented vehicle while on official state business, he/she shall wear a seat belt and shoulder harness. The Departmental policy is based on the California mandatory seat belt law as contained in the California Vehicle Code (CVC) Section 27315(d)(1), which states in part:

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“No person shall operate a motor vehicle on a highway unless that person and all passengers . . . are *properly* restrained by a safety belt.”

This CVC section and Departmental policy means:

The driver or operator of any vehicle shall be responsible to ensure that **all passengers "BUCKLE-UP" before the vehicle is placed into operation.**

5.24 Visiting a construction or maintenance project

Whenever office employees are required to perform any work activity within the limits of a construction or maintenance project, they must contact the project Resident Engineer, or Region Manager before they enter the work zone and begin their work.

The purpose is to advise the engineer-in-charge (Resident Engineer) or maintenance supervisor of the reason for the visit, gain permission to enter the project or work zone and to proceed with their planned work activity.

The person-in-charge, or his/her designee, then can provide a brief orientation about safety hazards on the project and explain any particular operations, such as haul roads and detours that must be observed.

The person-in-charge may deny entry to the project if conditions warrant.

USING PERSONAL PROTECTIVE EQUIPMENT (PPE)

This section only briefly covers personal protective equipment (PPE) and has been condensed from Chapter 12 - PERSONAL PROTECTIVE EQUIPMENT (PPE).

See Chapter 12 for specific and detailed information about each type and category of personal protective equipment, and specific Departmental and Cal-OSHA regulations covering the use of personal protective equipment.

5.25 Head protection

All employees are responsible to wear hard hats during any work activity that may expose them to a head injury, and shall always wear a hard hat while working on foot near vehicular traffic.

5.26 Eye and face protection

Employees who are directed to work where there is a risk of contact with flying particles shall be required to wear appropriate eye and face protection.

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Employees **shall always wear** safety glasses or goggles while working near moving traffic or in highway work zones.

Employees who wear prescription corrected lenses should be provided with state-furnished safety glasses or goggles to cover their prescription eye glasses.

Only safety glasses that have approved design features of the American National Standards Institute (ANSI), standard known as ANSI Z87.1, shall be used. The "Z87.1" logo must be embossed on glasses used by Caltrans employees.

Supervisors may maintain a supply of state-furnished safety glasses or goggles in their offices as conditions warrant. Safety glasses can be obtained from District or Headquarters warehouse stock.

Contact lenses do not provide eye protection. Therefore, employees who wear contact lenses shall wear approved eye protection over their contact lenses if they are required to take a field trip, or work where there is a risk of receiving eye injuries.

5.27 Warning Garments (Vest, Shirt, or Jacket)

Departmental policy requires employees working on foot, and exposed to vehicular or equipment traffic, shall wear warning garments such as vest, coveralls, jacket, or shirt (button or pull-over style). The warning garments must be orange, strong yellow-green, or fluorescent versions of these colors.

- A vest of appropriate color equipped with reflective material is the standard for all Caltrans operations.
- A vest of appropriate color equipped with reflective material worn over white coveralls is required for Caltrans nighttime operations. Coveralls with reflective material conforming to the ANSI/ISEA 107-1999 standard may be used in lieu of the colored reflective vest.

Supervisors shall read Section 12.20 WARNING GARMENTS, in Chapter 12 - PERSONAL PROTECTIVE EQUIPMENT (PPE), before directing employees to leave the office and work where they may be exposed to vehicular traffic.

Employees should also read and become familiar with these instructions.

5.28 Foot protection

Employees are responsible to furnish their own footwear.

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JULY 1996

Whenever an employee is directed to leave his/her office and travel to a field work location, his/her normal footwear may not provide adequate foot protection. Before the trip begins, the supervisor and the employee must ensure that the footwear is acceptable for the job which he/she is being assigned and the hazards to which they may be exposed. If an employee is going to visit a construction or maintenance work zone, he/she should wear a work shoe or boot with soles made of neolite, neoprene, crepe, rubber, or similar material which will retain a nonslip surface when wet, damp, oily, or muddy.

Unacceptable footwear for visiting a construction and/or maintenance work zone are shoes with the following features:

- sandals and slippers
- any type of loose or open weave upper
- footwear with leather soles
- open toes and/or open heels

SPECIAL WORK ACTIVITIES

This section discusses safety tips about how equipment and employees can be used to provide an extra measure of safety while working near vehicular traffic.

5.29 Parking and/or stopping along streets and highways

When parking and/or stopping on the shoulder area of a highway, and the vehicle will not be used as a physical barrier, always park the vehicle as far off the paved shoulder area as possible. Choose a location carefully, so the vehicle will not affect passing traffic, and will not interfere with employee sight distances.

Where possible, park motor vehicles in a manner that will minimize exposure to moving vehicular traffic and provide a physical barrier between employees and any traffic that may enter the work zone.

5.30 Using physical barriers

Whenever employees work on a highway, freeway, or city street, the work should be planned and organized to minimize exposure to moving vehicular traffic.

Employees working on foot near a highway or street should always try to protect themselves from injury by utilizing some type of physical barrier such as a motor vehicle, guardrail, a fence, or other physical barrier.

Where possible, park motor vehicles in a manner that will provide a physical barrier between themselves and any traffic that may enter the work zone.

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5.31 Using a lookout

When it is impractical to use barrier vehicles, guardrail or other physical barriers, a person should be assigned to act as a lookout to provide warning from errant vehicles.

A lookout is a person responsible to lookout for approaching vehicular traffic to detect any unusual vehicle movement or errant driver behavior. The exclusive duty of the lookout is to continuously observe oncoming traffic to warn other workers whenever trouble is expected. The lookout assignment should be changed frequently to maintain a high degree of alertness.

5.32 Working in median areas

Employees who regularly work in an office should receive specialized training as to the hazards unique to median work areas, and working adjacent to moving highway traffic prior to working in median areas.

For work performed in a median area, the following precautions shall be taken:

1. Employees should park their vehicles within the median area where crossing the traffic lane on foot is not necessary. Exit the vehicle on the off-traffic side. In narrow medians, exit the vehicle on the side that will present the least exposure.
2. If the vehicle cannot be safely parked within the median area and the traffic lane must be crossed on foot, the following precautions must be taken:
 - (a) Wait for a break in the flow of vehicular traffic in all lanes that will allow you to cross a traffic lane.
 - (b) Do not carry any items or materials in your hands or arms that might hinder your visibility or movement.
 - (c) If the traffic volume is too heavy, wait until it is safe to cross the lanes.
3. If the work cannot be performed as planned due to high traffic volumes, the supervisor shall re-evaluate the work activity to prevent unnecessary exposure of employees to vehicular traffic.

The supervisor should contact the local Maintenance Region office or Construction office for information regarding planned lane closures or construction work in the area.

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5.33 Amber warning lights

Section 25256 of the California Vehicle Code (CVC) allows Caltrans vehicles to display flashing/rotating amber warning lights, ". . . when such vehicles are parked or working on the highway."

Amber lights should only be used to alert traffic of workers on foot or operations near the traveled way. Do not use the amber lights while driving, when parked in an established lane closure, or when no danger to the employee exists.

5.34 Night work

Supervisor shall discuss the hazards unique to working at night. If employees will be exposed to vehicular traffic, personal protective equipment including hard hat, eye protection, foot wear, and other (cold-weather, heat stress) clothing shall be discussed and/or required.

Warning garments of appropriate color equipped with reflective material are required whenever working on-foot, within the right-of-way or near vehicular or equipment traffic. See Section 5.27 WARNING GARMENTS (Vest, Shirt, or Jacket) for details.

Employees should be given sufficient advance notice of a night work operation to allow them to adjust their schedules and avoid unnecessary fatigue.

5.35 Hazardous spills

Whenever an employee discovers a spill of an unknown material or substance on a highway or street, the employee should:

1. During regular working hours, call the Maintenance Region Manager's office, if known, or the Caltrans Communications Center, or the California Highway Patrol (CHP), through 9-1-1.
2. Stay clear and "up wind" if possible, and avoid contact with the unidentified material.
3. Provide traffic control, possibly by closing a traffic lane or other traffic controls.
4. Call for assistance and wait for the experts.

If an employee determines that his/her personal safety may be in jeopardy, they should leave the area, and telephone appropriate authorities from another location.

CODE OF SAFE WORK PRACTICES**FIELD TRIPS****PREPARING FOR A FIELD TRIP****PHYSICAL AND ENVIRONMENTAL HAZARDS****TYPICAL FIELD TRIP HAZARDS:**

1. Adverse weather conditions
2. Slippery roadways
3. Moving vehicular or equipment traffic/traffic congestion
4. Hazardous parking areas
5. Noise
6. Impaired drivers
7. Footing on uneven terrain
8. Poor visibility
9. Contact with flying particles
10. Bending, stooping and lifting objects

SAFE WORK PRACTICES**TYPICAL PRECAUTIONS TO AVOID INJURY:**

1. Review Safety Manual for fieldwork safety items
2. Wear appropriate footwear, hard hat, safety glasses, and warning garments
3. Wear appropriate personal clothing
4. Perform pre-operation inspection on vehicle
5. Bend, stoop, and lift properly
6. Obey traffic laws
7. Be alert for other motorists
8. Stop and/or park vehicle in safe place
8. Exit vehicle properly, away from traffic
9. Avoid backing vehicle if possible
10. Use physical protection from traffic where practicable such as (a vehicle, guardrail, K-rail, etc.)
11. Work facing traffic and/or use lookout
12. Wear hearing protection as required.

STATE OF CALIFORNIA VEHICLE ACCIDENT REPORT STD. 270 (REV. 04/2002)		THIS REPORT MUST BE MAILED WITHIN 48 HOURS AFTER ACCIDENT (ACCIDENTS INVOLVING INJURY SHOULD BE FIRST CALLED OR FAXED TO ORIM AT (916) 376-5300 - CALNET 480-5300 - FAX (916) 376-5277. * CONFIDENTIAL INFORMATION * DO NOT RELEASE TO OTHER PARTIES WITHOUT CONSENT OF THE OFFICE OF RISK AND INSURANCE MANAGEMENT		DISTRIBUTION: ORIGINAL - District or Headquarters Office of Safety and Health	
ACCIDENT PREVIOUSLY REPORTED TO ORIM? (if yes, give date) <input type="checkbox"/> YES <input type="checkbox"/> NO				Page _____ of _____	
STATE DRIVER	NAME		AGE	EMPLOYING DEPARTMENT CALTRANS -	AGENCY BILLING CODE
	DRIVER'S LICENSE NO.	ACCIDENT DATE	TIME	OFFICE ADDRESS	AGENCY DOCUMENT NO. District/Cost Center
	WAS VEHICLE BEING USED ON OFFICIAL STATE BUSINESS? <input type="checkbox"/> YES <input type="checkbox"/> NO (If NO, attach explanation)				
	APPROXIMATE DATE DRIVER LAST COMPLETED STATE DEFENSIVE DRIVER TRAINING <input type="checkbox"/> NOT TAKEN			JOB TITLE	BUSINESS TELEPHONE
STATE VEHICLE	VEHICLE LICENSE NUMBER	VEHICLE YEAR, MAKE, MODEL		VEHICLE OWNER	
	BRIEFLY DESCRIBE DAMAGES TO STATE VEHICLE		ESTIMATED REPAIR COST	<input type="checkbox"/> DEPT OWNED <input type="checkbox"/> DGS POOL <input type="checkbox"/> RENTAL <input type="checkbox"/> EMPLOYEE OWNED IF DEPARTMENT OWNED OR RENTAL, ENTER OWNER'S NAME	
ACCIDENT DETAILS (See Reverse for Diagram and Description)	ACCIDENT LOCATION (Address/Area)			ROAD CONDITIONS	
				WEATHER CONDITIONS	
	(City/State)			TRAFFIC CONDITIONS	
	(County)			HOW FAST WERE YOU DRIVING	EST. SPEED OF OTHER CAR
	POLICE REPORT MADE <input type="checkbox"/> YES <input type="checkbox"/> NO		NAME AND ADDRESS OF INVESTIGATING AGENCY		
	AGENCY <input type="checkbox"/> CHP <input type="checkbox"/> OTHER		NCIC# _____ BADGE # _____		
OTHER VEHICLE	DRIVER'S NAME		AGE/DOB	VEHICLE LICENSE NO.	VEHICLE YEAR, MAKE, MODEL
	DRIVER'S LICENSE NO.	HOME TELEPHONE	WORK TELEPHONE	REGISTERED OWNER	
	DRIVER'S ADDRESS (Street, City, State, Zip Code)			OWNER'S ADDRESS	HOME TELEPHONE
					WORK TELEPHONE
	BRIEFLY DESCRIBE DAMAGES TO OTHER VEHICLE OR PROPERTY			NAME AND ADDRESS OF OTHER PARTY'S INSURANCE COMPANY	
INJURED	NAME		AGE	ADDRESS	HOSPITAL
	NAME		AGE	ADDRESS	HOSPITAL
WITNESS	NAME		TELEPHONE	ADDRESS	
	NAME		TELEPHONE	ADDRESS	
VEHICLE PASSENGERS STATE OTHER	NAME		ADDRESS		
	NAME		ADDRESS		
	NAME		ADDRESS		
	NAME		ADDRESS		

ADA Notice

For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3890 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814.

(CONTINUED ON REVERSE)

SAFETY MEETING REPORT

PMS-0110 (REV. 10/1999)

ACTION AND DISTRIBUTION:

- ☐ 1. First-line supervisor conducts meeting, completes, and signs form.
- ☐ 2. First-line supervisor retains and posts one copy.
- ☐ 3. First-line supervisor sends original to second-line supervisor for review.
- ☐ 4. Second-line supervisor reviews, signs original, and returns to first-line supervisor to file.
- ☐ 5. Additional routing to:

*Note: See Chapter 2,
Safety Meetings, in the
Caltrans Safety Manual
for details.*

MEETING DATE	OFFICE/CREW/PROJECT NAME	COST CENTER/PROJECT NUMBER
--------------	--------------------------	----------------------------

ATTENDANCE-SIGNATURE OF EMPLOYEES (Add additional sheets if required)

SAFETY TOPICS DISCUSSED

SAFETY SUGGESTIONS/COMMENTS

FIRST AND/OR SECOND-LINE SUPERVISOR'S COMMENTS

FIRST-LINE SUPERVISOR SIGNATURE	DATE	SECOND-LINE SUPERVISOR SIGNATURE	DATE
---------------------------------	------	----------------------------------	------

SUGGESTED TOPICS FOR DISCUSSION

- | | | | |
|--|---|--|---|
| <input type="checkbox"/> Safe work habits | <input type="checkbox"/> Maintenance, Chapter B | <input type="checkbox"/> Respirator safety | <input type="checkbox"/> Warning garments |
| <input type="checkbox"/> Safe work conditions | <input type="checkbox"/> Traffic control/flagging | <input type="checkbox"/> Confined spaces | <input type="checkbox"/> Body protection |
| <input type="checkbox"/> Codes of Safe Operating/Work Practice | <input type="checkbox"/> Slip/trip/fall hazards | <input type="checkbox"/> Hard hats | <input type="checkbox"/> Foot protection |
| <input type="checkbox"/> First aid treatment | <input type="checkbox"/> Protective vehicles | <input type="checkbox"/> Safety glasses | |

ADA Notice

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Before an Employee Drives a Vehicle on State Business

OK, YOU HAD A MOTOR VEHICLE ACCIDENT, SO NOW WHAT HAPPENS????

You are the State driver and it is immediately following the accident:

At the accident scene, keep safety in mind at all times, provide what help you are trained for to any injured, **do not admit fault or make any promises** that the State will pay for any damages. Using the STD. 269 Accident Identification card that should be in the glove compartment of all state vehicles, write down as much information as you can about the accident and other party. Complete and tear off the perforated part and give it to the other driver so they know who you are and how to contact our insurance carrier, the **Office of Risk and Insurance Management**. Complete the latest revision of the STD. 270 (rev. 3/2000)

immediately upon return to your office. If there were injuries to non-State parties or the other party suffered significant property damage, the supervisor must fax an advance copy to the Office of Risk & Insurance Management

(ORIM) at 916-376-5277 **or telephone** the accident report to ORIM **within 48 hours** at (916-376-5300).

1. Complete all sections of STD. 270

2. Enter the Equipment ID number of state vehicle as appropriate

3. Enter District and Cost Center numbers (Agency Doc. No.).

4. Give details as to be understood by someone who was not a witness

5. Make a simple diagram of the accident scene

6. Obtain an inspection and estimate of damage from Division of Equipment

7. Sign completed form and give to your supervisor

Be sure your supervisor reviews the STD. 270 **and signs it before** faxing an **advance** copy to ORIM (916) 376-5277 and the Caltrans Safety Office.

SUPERVISORS TAKE NOTICE!

THE REQUIREMENT FOR PROMPT REPORTING OF ALL DAMAGE TO STATE EQUIPMENT CANNOT BE OVERSTATED! TRAIN YOUR EMPLOYEES!

APPROVED MEDICAL FACILITIES AND PHYSICIANS**HEADQUARTERS****AUBURN**

Sutter Occupational Health
3288 Bell Road, Suite 200
(530) 887-0628

CITRUS HEIGHTS

MedClinic Occupational Health Clinic
8421 Auburn Blvd., Suite 120
(Riverside/Auburn Blvd., Exit off I-80)
1201 Alhambra Blvd., Suite 210
(916) 969-1160

ELK GROVE

MedClinic Elk Grove
9354 Elk Grove-Florin Road
(916) 686-5834
Sutter Medical Plaza/Laguna
8170 Laguna Blvd., Suite 210
(916) 683-3252

FAIR OAKS

MedClinic Fair Oaks
8055 Madison Avenue
(at Fair Oaks Blvd.)
(916) 966-2002

FOLSOM

Mercy Hospital of Folsom Occupational Health
1650 Creekside Drive, Suite 3500
(916) 983-7496
Kaiser Occupational Health Center
2155 Iron Point Road
(916) 817-5660
[Case Manager: Kristiana Cooney
(916) 817-5683]

RANCHO CORDOVA

Rancho Cordova Occup. Health Clinic
9755 Lincoln Village Drive
(at Bradshaw Road)
(916) 363-2045
Sutter Health Care Center
1941 Zinfandel Drive
(916) 635-3570

ROCKLIN

MedClinic Rocklin
4804 Granite Drive
(916) 624-5666

ROSEVILLE

Kaiser Occupational Health Clinic
1001 Riverside Avenue
Mott Building, 1st Floor
(916) 784-4100
[Case Manager: Janet Stanger
(916) 784-4410]
Sutter Occupational Health
Two Medical Plaza, Suite 105

(916) 797-4700

MedClinic Occupational Health Clinic
406-1/2 Sunrise Avenue
(916) 536-2525

SACRAMENTO

Kaiser Occupational Health Center
2016 Morse Avenue
(916) 973-5499
[Case Manager: Susan Twining
(916) 973-7760]
MedClinic Occupational Health Clinic
3160 Folsom Blvd. (at Alhambra)
(916) 733-3390
Sutter Health @ Work
1014 N. Market Blvd.
(916) 565-8600
U. S. HealthWorks
1675 Alhambra Blvd., Suite B
(916) 451-4580
U. S. HealthWorks
4700 Northgate Blvd., Suite 100
(916) 929-6161
U. S. HealthWorks
3680 Industrial Blvd., Suite 550-H

West Sacramento
(916) 373-7575
U. S. HealthWorks
6830 Stockton Blvd., Suite 200
(916) 394-2969
Methodist Hospital Emergency Room
7500 Hospital Drive
(916) 423-3000

SOUTH SACRAMENTO

Kaiser Occupational Health Center
6600 Bruceville Road
Building 3, 2nd Floor
(916) 688-2005
[Case Manager: Darlene Schueller
(916) 688-2462]
MedClinic Occupational Health Clinic
8120 Timberlake, Suite 112
(916) 681-6088

District 1**ARCATA**

Mad River Community Hospital
3800 Janes Road
(707) 822-3621
Arcata-Mad River Ambulance
(707) 822-4166 **emergency only**
(707) 822-3353 business calls

BOONVILLE

See UKIAH
Anderson Valley Ambulance

(707) 895-3123

Dial 911

CLEARLAKE

Redbud Community Hospital_

18th Avenue & Highway 53

(707) 994-6486

Ambulance

Dial 911

COVELO

See WILLITS

Covelo Fire Dept. & Ambulance

(707) 983-6719

CRESCENT CITY

Redwood Medical Center

1240 Marshall Street

(707) 465-5566

Sutter Coast Hospital

800 E. Washington Blvd.

(707) 464-8511

Del Norte Ambulance Service

(707) 464-9551

EUREKA

General Hospital

2200 Harrison Avenue

(707) 445-5111

St. Joseph Hospital

2700 Dolbeer Street

(707) 445-8121

Emergency Room: 445-5040

City Ambulance of Eureka Inc.

(707) 445-4907

Dr. Salter/Dr. Smuckler

3116 Harrison Avenue

(707) 444-3885

FORT BRAGG

Mendocino Coast Dist. Hospital_

700 River Drive

(707) 961-1234

Fort Bragg Ambulance Services

(707) 961-5444

FORTUNA

Fortuna Family Medical Group

874 Main Street

(707) 725-3334

Humboldt Medical Group

3306 Renner Drive

(707) 725-6101

Redwood Memorial Hospital

3300 Renner Drive

(707) 725-3361

GARBERVILLE

So. Humboldt Community Clinic

509 Elm Street

(707) 923-3925

Gerald Phelps Humboldt Com. Hospital

733 Cedar Street

(707) 923-3921

Garberville Ambulance Service

Dial 911

GUALALA

Redwood Coast Medical Service_

46900 Ocean Drive

(707) 884-4005

Mendocino Coast Hospital – Fort Bragg

HOOPA

Kamow Medical Center

(530) 625-4261

Hoopa-Willow Creek Ambulance

(530) 625-4180

KELSEYVILLE

Kelsey Creek Medical Clinic

4241 Church Street

(707) 279-8813

LAKEPORT

Duane Bradley/Donald Joyce, M.D.

5375 Lakeshore Blvd.

(707) 263-5679

Sutter-Lakeside Community Hospital_

5176 Hill Road

(707) 263-5651

Ambulance

Dial 911

McKINLEYVILLE

See ARCATA

MIDDLETOWN

Middletown Medical Clinic

21337 Bush

(707) 987-3312

Ambulance

Dial 911

ORLEANS

See WILLOW CREEK

Ambulance

Dial 911

POINT ARENA

See FORT BRAGG or GUALALA

REDWAY

Redwoods Rural Health Center

101 Westcoast Road

(707) 923-2783

UKIAH

Ukiah Valley Medical Center Hospital_

275 Hospital Drive

(707) 462-3111

Ukiah Ambulance Service

(707) 462-3001

Dial 911

WILLITS

Frank R. Howard Memorial Hospital_

Madrone & Manzanita Avenue

(707) 459-6801
Willits Ambulance Service
(707) 459-7088
WILLOW CREEK
Six Rivers Medical Clinic
#8 State Highway 96
(530) 629-3116
Willow Creek Family Medical Group
38883 Highway 299
(530) 629-3111
Hoopa-Willow Creek Ambulance
(916) 625-4180

District 2**ALTURAS**

Modoc Medical Center
228 McDowell Street
(530) 233-5131

BIEBER

Big Valley Medical Service
100 N. Market Street
(530) 294-5241

BURNEY

Intermountain Family Practice Group
20641 Commerce Way
(530) 335-5457

CHESTER

Seneca Medical Group
372 Main Street
(530) 258-3191

CHICO

Chico Immediate Care
376 Vallombrosa Avenue
(530) 891-1676

FALL RIVER MILLS

Fall River Health Center
43563 Highway 229 East
(530) 336-6535

HAPPY CAMP

Happy Camp Health Services
38 Park Way Drive
(530) 493-5257

HAYFORK

Dr. Donald Krouse
Highway 3
(530) 628-5517

KLAMATH FALLS, OR

Basin Immediate Care
3150 South 6th Street
(541) 883-2337

Merle West Medical Center
2865 Daggett Avenue
(541) 882-6311

MT. SHASTA

Siskiyou Medical Group

822 Pine Street
(530) 926-5261

PORTOLA

Eastern Plumas Health Care
Appointment Only
480-1st Avenue
(530) 832-4211

QUINCY

Plumas District Hospital
1065 Bucks Lake
(530) 283-2121

RED BLUFF

Lassen Medical Group
2580 Sister Mary Columbia Drive
(530) 527-0414

REDDING

RIOH/Medical Clinics
1710 Churn Creek Road
(530) 226-0310
Everyday Health Care
3270 Churn Creek Road
(530) 222-6886

RENO

Washoe Medical Center
77 Pringle Way
(775) 982-4100

SUSANVILLE

Dr. Hal Meadows
Appointment Only
705 West Street
(530) 257-7251
Lassen Community Hospital
560 Hospital Lane
(530) 257-5325

WEAVERVILLE

Dr. Donald Krouse
252 Main Street
(530) 623-3735
Dr. Edward Dolci
310 Easter Avenue
(530) 623-4471
Dr. Harwood/Dr. Stemple
500 Trinity Lake Blvd.
(530) 623-3600

YREKA

Fairchild Group
475 Bruce Street
(530) 842-3507

District 3**AUBURN/COLFAX**

Sierra Doctors Center
275 Grass Valley Highway
(530) 885-0344
Auburn Faith Hospital

11815 Education Street
Highway 49 & Bell Road
(530) 885-7201

CAMERON PARK

Rapidcare
4062 Flying C Road, Suite 41
(530) 676-8234

CHICO

Convenient Care
(Pesticide Exposure Testing)
670 Rio Lindo Avenue, Suite 300
(530) 342-2273
Enloe Hospital
1531 Esplanade
(530) 332-7300

COLFAX

See AUBURN

COLUSA

See MARYSVILLE

DOWNIEVILLE

Frank Lang
Western Sierra Medical Clinic
209 Nevada Street
(530) 289-3298

ELK GROVE

See SACRAMENTO

GRASS VALLEY

Miners Community Clinic
700 Zion Street
(530) 265-7890
Yuba Docs Medical Group
12090 Nevada City Highway
(530) 274-5020
Sierra Nevada Memorial Hospital
155 Glasson Way
(530) 274-6000

LINCOLN

See ROSEVILLE

LOYALTON/SIERRAVILLE

Sierra Family Medical Group
700 West Third Street
(530) 993-1231
Sierra Valley Hospital
700 West Third Street
(530) 993-1225

MARYSVILLE/COLUSA/YUBA CITY

Sutter North Urgent Care
444 Plumas Blvd.
Yuba City
(530) 749-3420
Rideout Memorial Hospital
726 Fourth Street
Marysville
(530) 749-4300

NEVADA CITY

See GRASS VALLEY

OROVILLE

Premier Health Care
1940 Feather River Blvd., Suite 0
(530) 532-8824
Oroville Hospital
2767 Olive Highway
(530) 533-8500

PARADISE

Feather River Hospital
5974 Pentz Road
(530) 877-9361

PLACERVILLE

Marshall Hospital
Marshall Way
(530) 622-1441
Rancho Cordova
U.C. Medical Group
1100 Olson Drive, Suite 100
(916) 635-4120
U.S. HealthWorks
9261 Folsom Blvd., Suite 200
(916) 364-1733

ROCKLIN

U. S. Health Works
2305 Sunset Blvd.
(916) 632-9606

ROSEVILLE/LINCOLN

Kaiser Occupational Health Center
1001 Riverside Ave., Mott Bldg. 1st Floor
(916) 784-4100
[Case Manager: Janet Stanger
(916) 784-4410]

SACRAMENTO/ELK GROVE

UCD Medical Group
(Pesticide Exposure Testing)
11000 Olson Drive, Suite 100
Rancho Cordova
(916) 635-4120
Sacramento Medical Center
(Poison Center)
2315 Stockton Blvd.
(916) 734-2011
Sutter Occupational Health
Two Medical Plaza, Suite 105
(916) 797-4700
Urgent Care
(916) 797-4750
U. S. HealthWorks
1675 Alhambra Blvd., Suite B
(916) 451-4580
U. S. HealthWorks
4700 Northgate Blvd., Suite 100
(916) 929-6161

Sacramento/Elk Grove (continued)
 Kaiser Occupational Health Center
 2016 Morse Avenue
 (916) 973-5499
 [Case Manager: Susan Twining
 (916) 973-7766]
 Kaiser Occupational Health Center
 6600 Bruceville Road
 Building 3, 2nd Floor
 (916) 688-2005
 [Case Manager: Darlene Schuller
 (916) 688-2462]
SIERRAVILLE
 See LOYALTON

SOUTH LAKE TAHOE

Tahoe Urgent Care
 2130 Lake Tahoe Blvd.
 (530) 541-3277
 Barton Memorial Hospital
 South Avenue & 4th Street
 (530) 541-3420

TAHOE CITY

Truckee Tahoe Medical Group
 925 N. Lake Blvd., Suite 201
 (530) 581-8864

TRUCKEE

Sierra Multi-Specialty Medical Group
 10978 Donner Pass Road
 (530) 582-1212
 Truckee Tahoe Medical Group
 10024 Pine Avenue
 (530) 587-3887
 Tahoe Forest Hospital
 10950 Donner Pass Road
 (800) 733-9953

WEST SACRAMENTO

See SACRAMENTO

WILLOWS

Glenn Medical Center
 1133 W. Sycamore
 (530) 934-1800

WOODLAND

Sutter Health
 475 Pioneer Avenue, Suite 100
 (530) 406-5616
 Woodland Clinic Medical Group
 1207 Fairchild Court
 (530) 668-2660
 Woodland Memorial Hospital
 1325 Cottonwood
 (530) 662-3961

YUBA CITY

Urgent Care
 444 Plumas Blvd.

(530) 749-3420

District 4

ANTIOCH

Contra Costa Industrial Medical Clinic
 2339 Buchanan Road
 (925) 777-9194
 Kaiser Occupational Health Center
 3400 Delta Fair Blvd., Adobe Bldg.
 (925) 779-5434
 [Case Manager: Marsha Rees
 (925) 372-1113]

BENICIA

Sutter Health @ Work
 836 A Southampton Road
 (707) 745-4370

CAMPBELL

Gateway Family Medical Center
 50 E. Hamilton Avenue, Suite 100
 (408) 364-7600

CONCORD

Muir/Diablo Occupational Medicine
 2231 Galaxy Court
 (925) 685-7744

CORTE MADERA

Medical Center of Marin
 Marin Urgent Care Center
 101 Casa Buena Drive
 (415) 924-4525

DAVIS

Sutter Davis Hospital
 2000 Sutter Place
 (530) 756-6440
 Sutter Medical Plaza
 2020 Sutter Place, Suite 101
 (530) 750-5800

EMERYVILLE

Emeryville Occup. Med. Center (EOMC)
 6001 Shellmound Street, Suite 850
 (510) 653-5200

FAIRFIELD

North Bay Occupational Health
 1860 Pennsylvania Ave., Suite 300A
 (707) 429-7701

FOSTER CITY

Mariner Medical Center
 1261 E. Hillsdale Blvd., Suite #1
 (650) 570-2299

FREMONT

Fremont Urgent Care
 3161 Walnut Avenue
 (510) 796-1000
 Kaiser Occupational Health Center
 39400 Paseo Padre Pkwy., Mission Bldg.
 (510) 248-3015

[Case Manager: Karen Rickett
(510) 248-3724]

GILROY

Direct Care Medical Clinic
7880 Wren Avenue, Suite C-134
(408) 842-1316
Kaiser Occupational Health Center
7520 Arroyo Circle
(408) 846-2307
[Clinic Manager: Jamie McGuire
(408) 972-6806]
South Valley Family & Occup. Health Ctr.
9460 No Name Uno, Suite 230
(408) 842-1544

GREENBRAE

Sutter Health @ Work
1350 South Eliseo Drive, Suite 250
(415) 925-7888

GUALALA

Redwood Coast Medical Service
46900 Ocean Drive
(707) 884-4005

HAYWARD

Medical Express
22429 Hesperian Blvd.
(510) 782-7111
St. Rose Occupational Health Clinic
27200 Calaroga Avenue
(510) 785-9026
24-Hour Emergency Room
(510) 987-8611
U. S. HealthWorks
26120 Eden Landing Rd., Bldg. B., Ste. 1
(510) 264-3700

HAYWARD/UNION CITY

Kaiser Occupational Health Center
3555 Whipple Road
(510) 675-4807
[Clinic Manager: Connie Perez-English
(510) 675-2255]

HEALDSBURG

James F. Carroll, M.D.
421 March Avenue, Suite D
(707) 433-3321

KENTFIELD

Kentfield Occupational Medicine Center
1125 Sir Francis Drake Blvd., Suite N
(415) 485-3600

MARTINEZ

Kaiser Occupational Health Center
200 Muir Road, Hacienda Bldg., 1st Floor
(925) 313-0301
[Clinic Manager: Marsha Rees
(925) 372-1113]

MILPITAS

Alliance Occupational Medicine
315 South Abbott Avenue
(408) 790-2900
Kaiser Occupational Health Center
700 E. Calaveras Blvd.
(408) 945-5801
[Clinic Manager: Marilyn Howard
(408) 945-6142]
U. S. HealthWorks
1717 South Main Street
(408) 957-5700

NAPA

Work Health
1100 Trancas Street, Suite 300
(707) 257-4084
Kaiser Occupational Health Clinic
3285 Claremont Way, 2nd Floor
(707) 258-4907
[Clinic Manager: Carol Hodges
(707) 651-2953]
Occupational Health
1700 Soscol Avenue, Suite 1
(707) 257-7799

NEWARK

BizMed Occupational Health Clinic
5886 Mowry School Road
(510) 226-8832

OAKLAND

Sutter Health @ Work
Occupational Health Center
5700 Telegraph Avenue
(510) 204-4455
OakCare Occupational Health Center
675 Hegenberger Road, Suite 121
(510) 633-7654
U. S. HealthWorks
7817 Oakport Street #140
(510) 465-0701
Concentra Medical Center
384 Embarcadero West
(510) 465-9565
Kaiser Occupational Health Clinic
235 W. MacArthur Blvd., 3rd Floor
(510) 752-1244
[Clinic Manager: Sandie Weekes
(510) 752-6427]
U. S. HealthWorks
401 Roland Way, Suite 130
(510) 635-9515

PETALUMA

North Bay Corporate Health Services
1436 Professional Drive, Suite 302
(707) 765-1111
El Rose Medical Clinic
24 W. El Rose
(707) 763-9891

Kaiser Occupational Health Clinic
3900 Lakeville Hwy.
(707) 765-3800

[Clinic Manager: Mary Scala
(415) 444-2355]

PLEASANTON

Premier COMP
5635 W. Las Positas Blvd. Suite 401
(925) 520-0055

Kaiser Occupational Health Clinic
7601 Stoneridge Drive.
South Bldg., 1st Floor
(925) 847-5160

[Clinic Manager: Marsha Rees
(925) 372-1113]

POINT REYES

Point Reyes Clinic
3 Sixth Street
(415) 663-8666

REDWOOD CITY

Sequoia Hospital Occup. Health Service
633 Veterans Blvd., Suite A
(650) 364-1565

Kaiser Occupational Health Center
1400 Veterans Blvd., 1st Floor
(650) 299-4785

[Clinic Manager: Kaye Walster
(650) 299-4301]

RICHMOND

Greater Richmond Industrial Med. Clinic
120 Broadway Avenue, Suite 23
(510) 236-7243

Concentra
2970 Hilltop Mall Road, Suite 202/203
(510) 222-8000

Kaiser Occupational Health Center
901 Nevin Avenue
(510) 307-1560

[Clinic Manager: Margaret Solon-Street
(510) 307-2484]

RIO VISTA

Northbay HealthCare Services
690 Main Street
(707) 374-6833

ROHNERT PARK

Sutter Health @ Work
6174 State Farm Drive
(707) 586-4320

SAN FRANCISCO

Concentra Medical Center
728-20th Street
(415) 648-9501
Kaiser Occupational Health Center
601 Van Ness Ave., Suite 2008
Opera Plaza, Mezzanine Level

(415) 674-7000

[Case Manager: Beatrice Ceccato
(415) 674-7002]

CHW Health Center @ Pacific Bell Park
24 Willie Mays Plaza
(415) 972-2249

SAN JOSE

Doctors on Duty
1910-N Capitol Avenue
(408) 942-0333

Samaritan Medical Care Center
554 Blossom Hill Road
(408) 281-2772

U. S. HealthWorks
636 E. Santa Clara Street
(408) 275-9097

U. S. HealthWorks
2011 South Monterey Road
(408) 288-3800

SAN JOSE/SANTA TERESA

Kaiser Occupational Health Center
275 Hospital Parkway, Suite 565
(408) 972-6800

[Clinic Manager: Jamie McGuire
(408) 972-6806]

SAN LEANDRO

Sutter Health @ Work
1555 Doolittle Drive, Suite 180
(510) 351-7833

U. S. Healthworks
15035 East 14th Street
(510) 614-3724

Concentra
2587 Merced Street
(510) 351-3553

SAN MATEO

Mariner Medical Center
1261 E. Hillsdale Blvd.
Foster City

(415) 570-2299

SAN PABLO

EMC Medical Group
2160 Vale Road
(510) 233-0984

SAN RAFAEL

Kaiser Occupational Health Center
99 Montecillo Road
(415) 444-2900

[Clinic Manager: Mary Scala
(415) 444-2355]

SAN RAMON

San Ramon Regional Medical Center
Hospital-Emergency Room
6001 Norris Canyon Road
(510) 275-8280

SANTA CLARA

U. S. HealthWorks
988 Walsh Avenue
(408) 988-6868
Alliance Occupational Medicine
2737 Walsh Avenue
(408) 228-8400

SANTA CLARA/CUPERTINO

Kaiser Occupational Health Center
10050 N. Wolfe Road, Ste. SW1-190
(408) 236-6160
[Clinic Manager: Rosalie Mikelson
(408) 236-6151]

SANTA CRUZ

Santa Cruz Medical Clinic
2025 Soquel Avenue
(408) 423-4111

SANTA ROSA

North Bay Corporate Health Services
95 Montgomery Drive, Suite 110
(707) 576-7300 NEED APPOINTMENT
Work Care
1287 Fulton Road
(707) 543-2441
Kaiser Occupational Health Center
401 Bicentennial Way
(707) 571-3000
[Clinic Manager: Sandra Hanson-Velloo
(707) 571-4847]
Sutter Health @ Work
3327 Channate Road
(707) 576-4932

SO. SAN FRANCISCO

Health South
192 Beacon Street
(415) 589-6500
Pacific Occupational Health Clinic
3 So. Linden Avenue
(415) 589-2647
U. S. HealthWorks
884 Dubuque Avenue
(650) 635-0400

SO. SAN FRANCISCO/SAN BRUNO

Kaiser Occupational Health Center
Bayhill Medical Office
801 Traeger Avenue, 2nd Floor
(650) 742-7110
San Bruno
[Case Manager: Darlene Schuller
(650) 742-7134]

SUNNYVALE

Peninsula Industrial Medical Clinic
1197 East Arques Avenue
(408) 773-9000
U. S. HealthWorks

1195 East Arques Avenue, Suite 1
(408) 773-9000

UNION CITY

Health South
33560 Alvarado-Niles Road
(510) 489-8700

VACAVILLE

Kaiser Occupational Health Center
3700 Vaca Valley Parkway, 1st Flr, South
(707) 453-5515
[Case Manager: Nancy Murchison
(707) 453-5538]

VALLEJO

Kaiser Occupational Health Center
975 Sereno Drive
(707) 651-1370
[Case Manager: Carrie Torres
(707) 651-2951]

WALNUT CREEK

Kaiser Occupational Health Center
1425 S. Main Street
(925) 295-6466
[Clinic Manager: Marsha Rees
(925) 372-1113]
Muir/Diablo Occupational Medical
1981 N. Broadway, Suite 190
(925) 932-7715

WALNUT CREEK/PARK SHADELANDS

Kaiser Occupational Health Center
320 Lemon Lane, Lassen Bldg., 2nd Floor
(925) 906-2060
[Clinic Manager: Marsha Rees
(925) 372-1113]

WATSONVILLE

Watsonville Community Hospital
COMPQUIK Dept.
298 Green Valley Road
(408) 761-5612 or (408) 761-5627

WOODLAND

Sutter Health @ Work
475 Pioneer Avenue, Suite 100
(530) 406-5616

District 5**CARPINTERIA**

Santa Barbara Foundation Clinic
4806 Carpinteria Avenue
(805) 566-5000

GOLETA

Sansum/SBMF Immedicenter
101 S. Patterson Avenue
(805) 898-3311
Santa Barbara Medical Foundation Clinic
122 S. Patterson Avenue
(805) 681-1777

GREENFIELD

Urgent Care
634 Walnut Avenue
(831) 674-5066
So. Monterey Medical Group
806 Maple
(831) 674-5593

KING CITY

So. Monterey Medical Group
210 Canal Street
(831) 385-5471

LOMPOC

Santa Barbara Medical Foundation Clinic
1201 Ocean Avenue
(805) 737-8600
Santa Barbara Medical Foundation Clinic
217 West Central Avenue, Suite G
(805) 737-8686

MONTEREY

Doctors on Duty
501 Lighthouse Avenue
(831) 649-0770
Doctors on Duty
2260 North Fremont
(831) 372-6700
Convenient Medical Clinic
14 Ford Road
Carmel Valley
(831) 659-5531
Community Hos. of Monterey Peninsula
23625 W.R. Holman Highway
(831) 624-5311

SALINAS

Doctors on Duty
1212 S. Main Street
(831) 422-7777
Doctors on Duty
1137 N. Main Street
(831) 757-1110

SAN LUIS OBISPO

Med Stop
283 Madonna Road, Suite B
(805) 549-8880
Urgent Care Family Medical Center
47 Santa Rosa Street
(805) 542-9596

SANTA BARBARA

Urgent Care/SBMF
51 Hitchcock Way
(805) 563-6100

SANTA CRUZ

Doctors on Duty
615 Ocean Street
(831) 425-7991
Doctors on Duty

223 Mt. Herman Road
Scotts Valley
(831) 438-7555
Doctors on Duty
1505 Main Street
Watsonville
(831) 722-1444
Dominican Santa Cruz Hospital
1555 Soquel Drive
(831) 462-7700
Santa Cruz Medical Clinic
2025 Soquel Avenue
(831) 458-5537
Watsonville Community Hospital
75 Nielson Street
Watsonville
(831) 724-4741

SANTA MARIA

Santa Barbara Medical Foundation Clinic
2801 Santa Maria Way
(805) 938-3000

Industrial Medical Group of Santa Maria
3070 Skyway Drive
(805) 922-8282
Urgentcare Center
340 Betteravia Road, Suite C
(805) 922-0561

SOLVAG

Santa Ynez Valley/Cottage Hospital
700 Alamo Pintado Road
(805) 688-6431

TEMPLETON

Medi-Stop
225 Posada Lane, Suite C
(805) 434-3699
Twin Cities Community Hospital
1100 Las Tablas Road
(805) 434-3500

District 6**FRESNO**

Functional Industrial Rehabilitation
Medical Association
5084 N. Fruit, Suite 103
(559) 224-6754
Fresno Community Hospital
Fresno & R Street
(559) 442-6000
Concentra Medical Center
7265 North First Street, Suite 105
(559) 431-8181
Concentra Medical Center
2555 East Street
(559) 445-0606

St. Agnes Hospital
 1303 Herndon
 (559) 431-5000
 Kaiser Occupational Health Center
 7300 N. Fresno St., Oak 1 Bldg.
 (559) 448-4886
 [Clinic Manager: Joanne Jerome
 (559) 448-4831
 Valley Industrial & Family Medical Group
 Main Office
 2610 Tuolumne Street (at "P" St.)
 (559) 268-0666
 Valley Industrial & Family Medical Group
 North Office
 6011 N. Fresno Street, Suite #115
 (559) 440-9112
 Clovis Community Hospital
 2755 Herndon
 Clovis
 (559) 323-4000
 Concentra Medical Center
 6042 Fresno Street
 (559) 431-8181
 Sierra Meadows Medical Center
 48677 Victoria Lane
 Oathurst
 (559) 686-2199
 St. Agnes Occupational Health Center
 1189 E. Herndon Ave., Suite 103
 (559) 440-7777
 Palm Medical Group
 222 W. Shaw
 (559) 222-9200
 Sierra Kings Industrial Health Care
 1419 Acacia Avenue, Suite 110
 Reedley
 (559) 637-2355
WESTERN FRESNO COUNTY
 Coalinga District Hospital
 Washington & Sunset
 (559) 935-2051
KERN COUNTY
 Bakersfield Occupational Medical Group
 4580 California Avenue
 Bakersfield
 (661) 327-4527
Kern County (continued)
 Central Valley Family Medical Group
 333 S. 10th Street
 Taft
 (661) 763-3338
 Delano Regional Medical Center
 1401 Garces Highway
 Delano
 (661) 725-4800
 Dr. A. Giffen

109 Addison Way
 Taft
 (661) 765-2173
 Kaiser Occupational Clinic
 3501 Stockdale Highway
 Bakersfield
 (661) 398-5039
 [Case Manager: Elise Gonzales
 (661) 398-3470
 Memorial Hospital
 420-34th Street
 Bakersfield
 (661) 327-1792
 Mercy Hospital
 2215 Truxtun Avenue
 Bakersfield
 (661) 632-5275
 Mercy Medi Center
 Bernard & New Market Way
 Bakersfield
 (661) 632-5100
 Mercy Medi Center
 Stockdale & Old River Road
 Bakersfield
 (661) 663-6011
 Ming & Ashe Medical
 6501 Ming Avenue
 Bakersfield
 (661) 397-4004
 Valley Industrial Medical Group
 2501 "G" Street
 Bakersfield
 (661) 327-2225
 Westside District Hospital
 110 E. North
 Taft
 (661) 763-4211
EASTERN KERN COUNTY
 Kern Valley Hospital
 6412 Laurel Avenue
 Lake Isabella
 (760) 379-2681
KINGS COUNTY
 Immediate Care Center
 450 Greenfield Avenue
 Hanford
 (559) 582-9000
 Job Care
 500 Greenfield
 Hanford
 (559) 585-5126
 Sierra Valley Medical Group
 869 W. Lacey Blvd.
 Hanford
 (559) 582-9313
MADERA

Functional Industrial Rehabilitation
Medical Association
500 E. Almond, Suite 5B
(559) 674-3153

Concentra Medical Center
509 S. I Street
(559) 673-9020

TULARE COUNTY

Kaweah Delta Hospital
400 W. Mineral King
Visalia
(559) 635-2211

Morinda Medical Group
841 W. Morton
Porterville
(559) 781-8080

Sierra View District
465 W. Putman
Porterville
(559) 784-1110

Valley Prompt Care Medical Corp.
784 Prospect Street
Porterville
(559) 781-3014

Valley Prompt Care Medical Corp.
981 E. Prosperity
Tulare

(559) 684-8950
Visalia Medical Clinic
5400 Hillside
(559) 627-5222

District 7

BALDWIN PARK

Kaiser Occupational Health Center
1011 Baldwin Park Blvd.
(626) 851-5396
[Case Manager: Irene Kuwaki-Chuman
(626) 851-5641]

BELLFLOWER

Kaiser Occupational Health Center
9449 E. Imperial Hwy. Bldg. D, Ste. #140
(562) 803-2200
[Case Manager: Kelly Zoern
(562) 803-2013]

BURBANK

Providence St. Joseph Occupational
Health Center
3413 Pacific Avenue
(818) 953-4408

CAMARILLO/OXNARD

Santa Rosa Walk-in Med Center
4934 Verdugo Way
Camarillo
(805) 484-0095

St. John's/Pleasant Valley Hospital
2309 Antonio Avenue
(805) 484-2831

CERRITOS/SANTA FE SPRINGS

Health First Medical Group
11817 E. Telegraph Road
Santa Fe Springs
(562) 949-9328

COMMERCE

U. S. Health Works
3430 South Garfield Avenue
(323) 722-8481

EL MONTE

Health Care Partners Medical Group
3144 Santa Anita Avenue
(626) 582-7989

FILLMORE

Fillmore Medical Center
852 Ventura Street
(805) 524-2672

GARDENA/SOUTH LOS ANGELES

Centerpointe Medical Group
16630 Broadway
(310) 768-8155

HARBOR CITY

Kaiser Occupational Clinic
25965 S. Normandie Avenue
(310) 517-3739
[Case Manager: Susan Ward
(310) 517-3731]

IRWINDALE/MONROVIA

Foothill Medical Center
6520 N. Irwindale Avenue
(626) 812-0366

LANCASTER/PALMDALE

Antelope Valley Occupational Medical
43845 N. 10th Street West, Suite 2E
(661) 949-9126

LEBEC

Bakersfield Family Medical
4580 California Avenue
Bakersfield
(661) 327-4411

LONG BEACH/COMPTON/CARSON

U. S. Health Works
2107 East Del Amo Blvd.
Rancho Dominguez
(310) 637-9611

LOS ANGELES

Kaiser Occupational Health Center
1526 Edgemont Bldg. G
(323) 783-6621
[Case Manager: Connie Alvarez
(323) 783-6621]
Stacy Medical

1744 North Main Street
(323) 225-2261
U. S. Health Works-Metropolitan
1212 Flower Street
(213) 747-0634

MISSION HILLS/SAN FERNANDO VALLEY

Facey Medical Group
11211 Sepulveda Blvd.
Mission Hills
(818) 365-9531

NEWHALL/SANTA CLARITA

First Medical Care
25327 Avenue Stanford, Suite 105
Valencia
(661) 253-8686

PANORAMA CITY

Kaiser Occupational Health Center
13652 Cantara Street
(818) 375-2233
[Case Manager: Susan Biag
(818) 375-2795]

PASADENA/GLENDALE

Verdugo Hills Urgent Medical Care
544 North Glendale Avenue
(818) 241-4331

POMONA

U. S. Health Works
801 Corporate Center Drive, Suite 130
(909) 594-7551

SIMI VALLEY/MOORPARK

Med Center
1980 Sequoia Avenue
(805) 583-5555

VAN NUYS

U. S. HealthWorks
16300 Roscoe Blvd.
(818) 893-4426

VENTURA

Community Memorial Industrial/Hospital
138 W. Main Street
(805) 667-2850

Community Memorial Hospital
147 N. Brent Street
(805) 667-2850

WEST LOS ANGELES

Kaiser Occupational Health Center
5971 Venice Blvd., 4th Floor
(310) 915-4400
[Case Manager: Nasmeen Razak
(310) 915-4419]
Airport Urgent Care
1117 West Manchester Blvd.
Inglewood
(310) 216-7100

Citizens Medical Group
11560 West Pico Blvd.
Los Angeles
(310) 477-8285

WOODLAND HILLS

Kaiser Occupational Health Center
5601 De Soto Avenue
(818) 719-3006
[Case Manager: Youngsoon Lim
(818) 719-2413]

Woodland Hills (continued)

Dr. Allan L. Kurtz
Warner Medical Center
6325 Topanga Canyon Blvd, Suite 501
(818) 346-1440

District 8

PARKER, ARIZONA

LaPaz Regional Hospital
1200 Mojave Road
(520) 669-9201

APPLE VALLEY

Santa Fe Family Health
18182 Highway 18, Suite 105
(760) 242-1234
St. Mary Regional Medical Center
18300 Highway 18
(760) 242-2311

Desert Valley Medical Group
18077 Highway 18
(760) 242-8000

Central Occupational Medical Providers
16003 Tuscola Road, Suite F
(760) 242-8808

BANNING

San Gorgonio Pass Memorial Hospital
600 North Highland Springs Avenue
(909) 845-1121

BARSTOW

Desert Valley Medical Group Inc.
1301 E. Main Street
(760) 256-3864

Barstow Hospital
555 South 7th Street
(760) 256-1761

Dr. Mike's
716 East Main Street
(760) 256-6426

BIG BEAR

Bear Valley Community Hospital
41870 Garstin Road
(909) 866-6501

BLYTHE

Leon Peter Y. Chua, M.D.
500 W. Barnard/ 500 N. Broadway, Ste.17

(760) 922-2152

CATHEDRAL CITY

Desert Primary Care Express

68-325 Highway 111

(760) 323-6789

Eisenhower Immediate Care Center

67-780 E. Palm Canyon Drive

(760) 328-1000

COACHELLE VALLEY

Santa Rosa del Valle Medical Group

1293-6th Street

(760) 391-5151

COLTON

U. S. Healthworks

850 E. Washington Street

(909) 370-0572

CORONA

Comp Access

760 S. Washburn, Suite 4A

(909) 808-6700

Central Occupational Med. Providers

1690 West 6th Street, Suite K

(909) 736-9500

DESERT HOT SPRINGS

Desert Primary Care

13570 Palm Drive

(619) 329-1776

FONTANA

Fontana Industrial Medical Clinic

8110 Mango Avenue, Suite 106

(909) 357-1595

Kaiser Occupational Health Center

9961 Sierra Avenue, Bldg. 3B

(909) 427-3917

[Case Manager: Gloria Duck

(909) 427-6100]

HEMET

Talbort U.S. Family Care

1545 W. Florida

(909) 652-2961

HESPERIA

Friendly Medical Center

15462 Main Street

(760) 949-7000

JOSHUA TREE

Hi Desert Medical Center

6601 White Feather Road

(760) 366-3711

LA QUINTA

Eisenhower Immediate Care Center

78-822 Highway 111, Suite C

(760) 564-7000

LOMA LINDA

Central Occupational Medicine Providers

24630 Redlands Blvd.

(909) 478-7878

MIRA LOMA

Tri-Industrial Medical Center

10427 San Sevaine Way, Suite J

(909) 360-8333

MORENO VALLEY

U. S. Healthworks

6485 Day Street, Suite 302

(909) 653-5291

Moreno Valley Ambulatory Surgery Center

24384 Sunnymead Blvd.

(909) 247-8080

NEEDLES

Colorado River Medical Center

1401 Bailey Avenue

(760) 326-4531

ONTARIO

Milliken Medical Group

1101 South Milliken Avenue, Suite C

(909) 390-2799

Inland Industrial Medical Group

1910 South Archibald Avenue, Unit E-2

(909) 930-5270

U. S. Healthworks

3200 Inland Empire Blvd., Suite 100

(909) 945-5011

Central Occupational Medicine Providers

59 S. Milliken Avenue, Suite 100

(909) 605-8888

U. S. HealthWorks

2171 S. Grove Avenue, Suite A

(909) 923-4080

PALM DESERT

Desert Urgent Care

74-990 Country Club Drive #310

(760) 341-8800

PERRIS

First Care Industrial

2226 Medical Center Drive #101

(909) 657-6559

PHELAN

Phelan Clinic

3936 Phelan Road, Suite F1

(760) 868-6622

REDLANDS

Redlands Community Hospital

350 Terracina Blvd.

(909) 335-5500

RIVERSIDE

Parkview Ctr. for Occupational Medicine

9041 Magnolia Avenue, Suite 302

(909) 354-8020

U. S. Healthworks

1760 Chicago Ave., Suite J-3

(909) 781-2200

Riverside Industrial Medical Clinic
2002 Iowa Avenue, Suite 104

(909) 682-2222

Central Occupational Medicine Providers
4300 Central Avenue

(909) 222-2206

Kaiser Occupational Health Center
10800 Magnolia Ave., Module 4J

(909) 353-4322

[Case Manager: Sue Carter
(909) 353-4214]

SAN BERNARDINO

U. S. Healthworks

599 Inland Center Drive, Suite 105
(909) 889-2665

Fox Occupational Medical Center
1375 Camino Real, Suite 130

(909) 884-1500

Cornerstone Medical Group Inc.
201 E. Airport Drive, Suite B

(909) 890-1888

TEMECULA

Rancho Urgent Care

27699 Jefferson Avenue, Suite 109
(909) 676-6668

First-Care Industrial

28991 Front Street #104
(909) 699-8563

VICTORVILLE

Desert Valley Medical Group
15860 Bear Valley Road

(760) 241-8000, ext. 8600

WILDOMAR

Inland Valley Regional Medical Center
36485 Inland Valley Drive

(909) 677-1111

Inland Urgent Care

36243 Inland Valley Drive, Suite 180
(909) 600-0110

YUCCA VALLEY

Avalon Urgent Care Center

58471 Twenty-Nine Palms Hwy., Ste. 303
(760) 365-0851

HENDERSON, NEVADA

Saint Rose Dominican Hospital
102 E. Lake Mead Drive

(702) 564-2622

LAS VEGAS, NEVADA

Sunrise Hospital Medical Center
3186 Maryland Parkway South

(702) 564-2622

District 9

BAKERSFIELD

Kaiser Occupational Health Center
3501 Stockdale Highway

(661) 398-5070

[Case Manager: Eillen Lua
(661) 398-5093]

Memorial Hospital

420-34th Street

(661) 327-1792

Bakersfield Occupational Medical Group

4580 California Avenue

(661) 327-4527

Mercy Hospital

2215 Truxtun Avenue

(661) 632-5275

Mercy Medi Center

Bernard & New Market Way

(661) 632-5100

Valley Industrial Med Group

2501 "G" Street

(661) 327-2225

EASTERN INYO

Nevada Rural Health Centers, Inc.

Beatty Clinic

P. O. Box 431

Beatty, NV

(702) 553-2208

Nevada Rural Health Centers, Inc.

Amargosa Valley Medical Clinic

845 Farm Road HCR 69, Box 401-V

Amargosa Valley, NV

(775) 372-5432

Death Valley Health Clinic

P. O. Box 158

Shoshone, CA

(760) 852-4383

Desert Spring Hospital

2075 E. Flamingo Road

Las Vegas, NV

(702) 733-8800

North Las Vegas Community Hospital

1409 E. Lake Mead Blvd.

N. Las Vegas, NV

(702) 649-7711

NORTHERN INYO

Family Health Center

686 W. Line Street

Bishop

(760) 872-4311

Northern Inyo Hospital

150 Pioneer Lane

Bishop

(760) 873-5811

Rural Health Clinic

153 Pioneer Lane

Bishop

(760) 873-2849

SOUTHERN INYO

M. R. Jones, M.D.

131 W. Whitney Portal Road

Lone Pine

(760) 876-8118

501 E. Locust Street

Lone Pine

(760) 876-5501

EASTERN KERN

Kern Valley Hospital

6412 Laurel Avenue

P. O. Box 1628

Lake Isabella

(760) 379-2681

Drummond Medical Group, Inc.

1111 China Lake Blvd.

Ridgecrest

(760) 446-0240

SOUTHEASTERN KERN

Alpine Medical Clinic

20211 Valley Blvd.

Tehachapi

(661) 822-5544

Antelope Valley Occupational Medical

43845 N. 10th Street West, Suite 2E

Lancaster

(661) 949-9126

Tehachapi Hospital

115 West E. Street

Tehachapi

(661) 822-3241

Gary Olsen, M.D.

20693 Valley Blvd.

Tehachapi

(805) 822-0583

Sierra Family Care

20797 Santa Lucia

Tehachapi

(661) 822-9105

Mojave Medical Clinic

2041 Belshaw Street

Mojave

(661) 824-4511

NORTHERN MONO

Mono County Medical Clinic

P. O. Box 677

Twin Lakes Road

Bridgeport

(760) 932-7011

Minden Medical Center

925 Ironwood Drive

Minden, NV

(775) 782-8181

Washoe Medical Center

77 Pringle Way

Reno, NV

(775) 982-4100

Carson-Tahoe Hospital

775 Fleischmann way

Carson City, NV

(775) 882-1361

Carson Valley Medical Center

1107 Hwy. 395 South

Gardnerville, NV

(775) 782-1500

(775) 782-1615 Occupational Center

Sierra Park Family Medical Clinic

P. O. Box 555

Mammoth Lakes

(760) 934-2511

Mammoth Hospital

Sierra Park Road

Mammoth Lakes

(760) 934-3311

Mono County Medical Clinic

P. O. Box 677

Twin Lakes Road

Bridgeport

(760) 932-7011

District 10

ANGLES CAMP

Angels Camp Medical Clinic

222 South Main

(209) 736-0813

ARNOLD

C. A. Cunningham, M.D.

771 Highway 4

(209) 795-4193

JACKSON

(Emergencies Only)

Amador County Hospital

810 Court Street

(209) 223-7500

LOS BANOS

J. F. Mevi, M.D.

400 West "I" Street, Suite A

(209) 826-3200

MANTECA

Kaiser Occupational Health Center

1721 W. Yosemite Avenue

(209) 824-5059

[Clinic Coordinator: Denise Giordano

(209) 824-5019]

MARIPOSA

Mariposa Family Medicine & Assoc.

5300 Highway 49

(209) 966-3672

MARKLEEVILLE

Alpine County Health Dept.

75 B Diamond Valley Road

(530) 694-2146

Physician on duty Tues. & Thurs. ONLY

MERCED

Lifetime Health Care Medical Assoc.

and Mercy Urgent Care

374 West Olive, Suite B

(209) 383-3076

Mercy Medical Center

301 East 13th Street

(209) 385-7100

(Emergencies Only)

Mercy Hospital

2740 "M" Street

(209) 984-6501

MODESTO

Gould Medical Group

600 Coffee Road

(209) 524-1211

Healthsouth Center

2101 Tenaya Drive

(209) 527-0080

Kaiser Occupational Health Center

3800 Dale Road

(209) 557-6145

[Clinic Manager: Melanie Hatchel

(209) 476-3324]

U. S. HealthWorks

1524 McHenry Avenue, Suite 500

(209) 575-5801

MURPHYS

Ryan Thompson, M.D.

300 Church Street

(209) 728-2021

PIONEER

Sutter Amador Health Centers

Highway 88

(209) 295-5544

PLYMOUTH

Sutter Amador Health Centers

9279 Locust Street

(209) 245-6968

SONORA

(Emergencies Only)

Prompt Care – Indian Rock

14540 Mono Way

(209) 532-3167

SOUTH LAKE TAHOE

Tahoe Urgent Care

2130 Lake Tahoe Blvd.

(530) 541-3277

(Emergencies Only)

Barton Memorial Hospital

South Avenue & 4th Street

(530) 541-3420

STOCKTON/LODI

Dameron Urgent Care Center

525 W. Acacia Street

(209) 461-3194

Sierra Occup. Services Medical Clinic

1429 W. Fremont Street

(209) 546-7767

Kaiser Occupational Health Center

7373 West Lane, 1st Floor

(209) 476-3694

[Clinic Manager: Melanie Hatchel

(209) 476-3324]

Healthsouth

3663 E. Arch Road, Suite 400

(209) 943-2202

TRACY

Dr. Jagdish Patel

644 W. 12th Street

(209) 832-8984

TURLOCK

Turlock Medical Clinic

1015 E. Main Street

(209) 632-3909

WOODFORDS

Carson Valley Medical Center

1107 Hwy. 395, Suite F

Gardenville, NV

(775) 782-1615

District 11

BRAWLEY

Valley Comp. Health & Immediate Care

608 G Street, Suite B

(760) 344-7454

CARLSBAD

U. S. HealthWorks

5814 Van Allen Way, Suite 210

(760) 438-4466

CHULA VISTA

U. S. HealthWorks

111 Broadway, Suite 305

(619) 425-8212

EL CENTRO

Valley Comp. Health & Immediate Care

2026 N. Imperial Avenue

(760) 353-6600

ESCONDIDO

U. S. HealthWorks

362 West Mission Avenue, Suite 104

(760) 747-2330

HILLCREST

U. S. HealthWorks

3930 4th Avenue, Suite 200

San Diego

(619) 297-9610

KEARNY MESA

U. S. HealthWorks
5575 Ruffin Road
San Diego
(858) 227-2744

LA MESA

U. S. HealthWorks
8090 Parkway Drive
(619) 277-2744

MIRAMAR

U. S. HealthWorks
7590 Miramar Road, Suite C
San Diego
(858) 549-4255

NATIONAL CITY

U. S. HealthWorks
102 Mile of Cars Way
(619) 474-9211

SAN DIEGO

Kaiser Occupational Health Clinic
4647 Zion Avenue
(619) 528-5062
[Case Manager: Margaret Smith
(619) 528-6077]

SANTEE

U. S. HealthWorks
9745 Prospect Avenue, Suite 100
(619) 448-4841

SORRENTO MESA

U. S. HealthWorks
5897 Oberlin Drive, Suite 100
San Diego
(858) 455-0200

Sorrento Mesa (continued)

Kaiser Occupational Health Center
780 Shadowridge
(760) 599-2333
[Case Manager: Margaret Smith
(619) 528-6077]

VISTA

U. S. HealthWorks
2023 West Vista Way, Suite C
(760) 941-2000

District 12**ANAHEIM-ORANGE**

Concord Medical dba
Goldenwest Medical
915 East Katella Avenue, Suite 200
(714) 517-2100
Kaiser Occupational Health Center
411 N. Lakeview Avenue
(714) 279-5500
[Case Manager: Deborah Lopez
(714) 279-5458]

FULLERTON

St. Jude Heritage Health Foundation
2151 N. Harbor Blvd.
(714) 992-3967

GARDEN GROVE

Kaiser Occupational Health Center
12100 Euclid Street
(714) 741-3688
[Case Manager: Wendy Green
(714) 741-3684]

Tustin Irvine Medical

7052 Orangewood
(714) 903-1100

IRVINE

San Canyon Urgent Care Med. Center
16100 Sand Canyon, Suite 150
(949) 417-0272
U. S. Healthworks
2362 Morse Avenue
(949) 863-9103

LAKE FOREST

Saddleback Urgent Care Center
22581 Lake Forest Drive
(949) 770-1023

MISSION VIEJO

Saddleback Urgent Care Center
23962 Alicia Parkway
(949) 770-6000

ORANGE

Convenient Medical Care
1045 North Tustin Avenue
(714) 921-0911
Sunrise Multispecialist Medical Center
867 South Tustin Avenue
(714) 771-1420

PLACENTIA

St. Jude Heritage Health Foundation
1501 N. Placentia Avenue
(714) 524-7333

SAN JUAN CAPISTRANO

South Coast Family
25500 Rancho Niguel Road, Suite 100
(949) 643-0500

SANTA ANA

East Edinger Medical Clinic
1530 East Edinger
(714) 542-8904

TUSTIN-SANTA ANA

Kaiser Occupational Clinic
1900 E. 4th Street
(714) 967-4600
[Case Manager: Gloria Soto
(714) 967-4600]

APPENDIX

The following table can be used to identify the severity of damage to bridges.

EARTHQUAKE BRIDGE DAMAGE LEVEL CATEGORIES

Damage State		Functionality	Repairs Required	Expected Outage
None (pre-yield)	(1)	No Loss.	None	None
Minor/Slight	(2)	Slight Loss.	Inspect, Adjust, Patch	< 3 days
Moderate	(3)	Some Loss.	Repair Components	< 3 weeks
Major/Extensive	(4)	Considerable loss.	Rebuild Components	< 3 months
Complete/Collapse	(5)	Total loss.	Rebuild Structure	> 3 months

OBSERVE - NOTE - PHOTOGRAPH

- Views of structures in elevation and foreshortened views to show general condition.
- Ground cracks, displacements, liquefaction, slides, settlement, etc.
- Structure cracks and failures - Determine if due to bending, shear, compression, etc.
- Abutments, piers, wingwalls, retaining walls, etc. Check for signs of movement; alignment, plumb, cracking.
- Take samples of rebar at failures. (At bond and tension failures. Samples should be about 3 feet long. Take one sample from where it failed and another where it probably wasn't stressed beyond yield. Label and note location where obtained. Maintenance people or Resident Engineers on nearby jobs may be able to get assistance for cutting the bars.)
- Indications of movements at hinges, joints, railing, curbs. Some bridges have scribes at rail joints. If so, check amount of movement.
- Damaged utilities in, on or near the bridge. Signs of electrical shorting. Disconnected power lines.
- Distress, cracking or movement -- signs, electroliers, barriers, etc.
- Exposed piles.
- Connection of widenings to original structures.
- Scrape marks, dents, holes, indicating parts of structures sliding or hitting each other.
- Direction of leaning or falling.
- Deformed or displaced bearings.
- Condition of equalizing bolts, restrainers, shear keys.
- Broken welds, rivets or bolts.
- Warping or tearing of steel.
- Condition of structures, equipment and facilities in vicinity of bridges -- record location and compass heading or direction the camera is facing.
- Comments from eyewitnesses.

MISCELLANEOUS COMMENTS

It is likely that a heavily damaged area will be well guarded to keep out sightseers, unauthorized persons, looters, etc. Caltrans Photo ID's, hard hats with Caltrans Labels, state autos or private autos with magnetic door seals should facilitate entry into the area.

The object of these investigations is to get as much accurate information as possible before the evidence is destroyed. Getting to the site as quickly as possible is of prime importance. Tape recorders can document comments quicker than writing. Transcribing the tapes and desired editing can be done at a later date. Don't skimp on taking notes.

Immediate attention should be given to structures over railroads and heavily traveled highways or critical routes since damaged structures blocking these facilities are likely to be removed as quickly as possible in order to restore normal traffic or remove a hazard to traffic underneath. Little information can be obtained from those structures after removal or demolition operations have started.

Don't avoid taking a picture because you'll be back later to get a better one. Take it anyway. The cost and time involved in taking pictures is negligible compared to all other expenses. They are the most accurate records that can be obtained and the cost is very minor. Don't trust your memory. Identification is very important.

Use the tape recorder to describe each picture as it is taken -- which bridge, exact location, direction, etc. The first couple pictures of each roll should have some distinguishing detail to identify it from other rolls. When necessary, include a person, pencil, rule, hard hat or other common object to relate area of view, size of detail location, etc. Take photos of critical details from several angles. When exposures or details are critical take three pictures -- "correct" exposure, one stop under and one stop over.

Positive recording that there is no damage may be as important as recording damage. Take photos and note in the recorder that columns are not cracked, abutments not affected, hinges did not show signs of abnormal movements, wing-walls not cracked or settled, approach fills didn't settle, horizontal and vertical alignment appears to be normal, etc. Keep in mind that "no damage" evidence as well as "damage" evidence may eventually be used in court. Photograph the entire bridge and any pertinent geological features near it.

Special attention should be given to structures if injuries or fatalities are involved.

It is better to use more tape and film than necessary and edit later than to find out that you didn't use enough. Each photograph and/or slide should be labeled with the photographer's initial, roll number, number of pictures on the roll, as well as the route, postmile, bridge name, and a brief description of the damage.

The team leader should make certain that there aren't any gaps in the photo coverage because each person is assuming that someone else is doing it. Your one and only purpose for being on this team is to get as much accurate information as possible concerning the

damage in the shortest feasible time. Don't allow yourselves to be sidetracked by outside engineers, professors, reporters, citizens, or anyone else attempting to get information, opinions, evaluations, etc. However, cooperation with the bridge maintenance engineers can be mutually beneficial.

1. Constitute and assemble an investigative team as quickly as possible after the event.
2. Transport the investigative team to the earthquake site as fast as possible in order to obtain undisturbed data with the least possible delay. If necessary, one member with camera should leave immediately.
3. Alert District and Bridge Maintenance forces to take as many photos as possible before disturbing or removing any damaged structures.
4. Notify District Director that a Structures team is in the area for gathering technical information. (See "RESOURCES")
5. If you have a Caltrans radio, notify the District Communications dispatcher when you enter or leave the District. (See "RESOURCES")
6. Provide the PEQIT Coordinator with your motel name, location and phone number.
7. Gain as much information as possible about damaged bridges and related transportation structures, in the event of an earthquake.
8. In areas of serious bridge damage, it is sometimes helpful to make a cursory investigation of adjacent building damage, or search for signs of ground surface distress. Sometimes these sources can help establish the primary direction of the ground motion or other factors.
9. Get names and addresses of persons who may have taken photos before you got there. Buy local newspapers -- we may want to buy some of their photos.
10. It is impossible to set up an exact procedure which will take care of every situation. The guidelines given here are based on past experience and should necessarily be modified to suit the situation.
11. Report results of the investigation in a timely and usable manner. A brief summary of the damage may be required within one week of the investigation. A final report should be ready for final typing and publication within one month for most investigations.

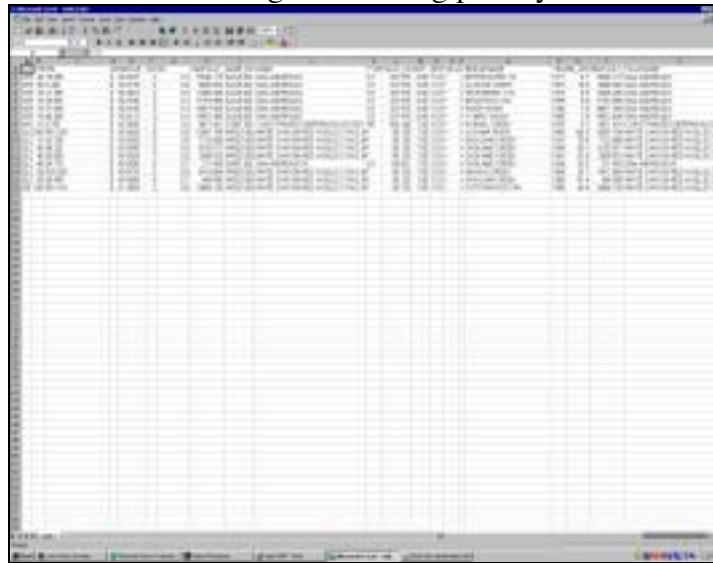
**Procedure for Using ArcView and ShakeMap to Create a List of Bridges at Risk
Following Earthquakes**

- 1) About 10-minutes after an earthquake, download the 1-second spectral acceleration shapefile from ShakeMap web site as follows:
 - Go to ShakeMap homepage at <http://www.trinet.org/shake/>

- Navigate to “Most Recent Earthquake”
 - Select “Download” from top menu bar.
 - Select “shape.zip” under GIS files to download a compressed shapefile.
 - Uncompress “shape.zip”. This will create about 15 GIS files.
- 2) Do ArcView Analysis as follows:
- Open default project “Post-EQ Priorities.apr” which has 3 shapefiles loaded:
 - state bridges (st-br.shp),
 - state highways (st-hwys.shp),
 - district boundaries (district)
 - Add the following theme: “psa10.shp”
 - Edit the theme legend using the legend editor as follows:
 - use “graduated color legend”
 - use “Value” for the classification field
 - modify the classification field as follows:

Symbol	Value	Label
Red	0.9 to 5.0	Severe Damage Possible (All Bridges)
Yellow	0.4 to 0.899	Severe Damage Possible (Pre-1975 Bridges)
Green	0.2 to 0.399	Some Damage Possible
Clear	0 to 0.199	Damage Unlikely

- Use “Geoprocessing Wizard” to perform a spatial join of “st-br.shp” w/ “psa10.shp”
- Scale and print map products!!
- Export tabular data for sorting and creating priority lists.



INSTRUMENTED BRIDGES

#	Built	Installed	Bridge Name	Bridge #.	Post Mile	Location	Type	Spans	Length
1	1965	4/13/95	Klamath River	01-0028	01-DN-101-R4.04	Klamath	RC Box	12	2038
2	1941	no power	Eel River	04-0016R		Rio Dell	Steel Truss	8	1643
3	1971	4/12/96	Samoa Channel	04-0228	01-HUM~255~1.2	Eureka	PC/PS Gir	20	2506
4	1971	4/10/96	Middle Channel	04-0229	01-HUM~255-0.7	Eureka	PC/PS I-Girder	9	1082
5	1971	4/9/96	Eureka Channel	04-0230	01-HUM-255-0.2	Eureka	CIP/PS Box Gir	15	1817
6	1976	9/29/77	Painter St. OC	04-0236	01-HUM-101-R52.89	Rio Dell	CIP/PS Box Gir	2	265
7	1964	4/6/95	Murray Road	04-0170	01-HUM-101-R92.99	Arcata	RC T-Gir	4	182
8	1951	3/17/94	Salmon Creek	10-0134	01-MEN-1-43.00	Mendocino.	Steel Truss	7	685
9	1933	2/7/98	Big Dann	10-0030	01-MEN-101-R9.53	Sonoma	RC Girder	7	585
10	1933	2/7/98	Cedar Creek	10-0031	01-MEN-271-4.9	Sonoma	RC Girder	7	609
11	1966	10/22/97	Hopland	10-0081	01-MEN-271-5.2	Ukiah	RC Box Gir	5	311
12	1989	11/14/95	Union Mills BOH	17-0058L	03-NEV-80-20.23	Truckee	CIP/PS Box Gir	3	962
13	1984	9/29/93	Russian River	20-0195	04-SON-1-19.72	Sonoma Co.	CIP/PS Box Gir	6	910
14	1973	5/4/95	Rohnert Park Exp	20-0235	04-SON-101-13.88	Rohnert Park	CIP/PS Box Gir	2	282
15	1962	underway	Yolo Causeway	22-0045	03-YOL-80-7.25	Sacramento	RC Girder	220	8800
16	1958	3/1/99	Petaluma River	27-0013	04-MRN-37-14.47	Navato	PC/PS T-Girder	29	2183
17	1937	12/10/79	Caldecott Tunnel	28-0015	04-CC-24-R0.01	Berkeley	RC Arch Tunn	NA	3371
18	1962	3/2/94	Benicia Toll Br.	28-0153	04-CC-680-25.04	Martinez	Steel Truss	18	6215
19	1979	4/6/98	San Joaquin River	28-0009	04-CC-160-0.82	Antioch	RC Box Girder	70	9436.8
20	1988	6/11/93	580/238 Sep.	33-0214L	04-ALA-580-30.80	Castro Valley	CIP/PS Box Gir	14	2030
21	1970	5/20/93	North Conn.	33-0302H	04-ALA-580-45.23	Oakland	RC Box Gir	36	3284
22	1965	5/26/93	580 Ramp/13 Sep.	33-0347S	04-ALA-480-R39.15	San Leandro	RC Box Gir	3	290
23	1936	3/6/92	Bay Bridge	33-25/34-3	04-ALA-80-0.0	Oakland	Truss/Suspen.	52/11	43262
24	1982	6/10/87	Dumbarton.	35-0038	04-SM-84-29.0	Fremont	PC/PS Box Gir	85	8600
25	1967	10/28/93	San Mateo Toll Br.	35-0054	04-SM-92-14.44	Hayward	Twin Steel Box	908	36069
26	1957	12/5/85	Sierra Point OH	35-0130	04-SM-101-23.7	S. San Fran.	Steel Gir	10	616
27	1973	11/19/93	Crystal Springs	35-0285	04-SM-280-10.56	Belmont	CIP/PS Box Gir	3	374
28	1962	4/16/97	Tunitas Creek	35-0031	04-SM-1-20.82	Half Moon Bay	PC/PS I-Girder	6	421
29	1990	11/23/94	Struve Slough	36-0088	04-SCR-1-R1.59	Watsonville	RC Slab	22	796
30	1995	10/10/96	South Alviso OH	37-0470R	04-SCL-237-6.10	San Jose	CIP/PS Box Gir	6	447
31	1995	10/10/96	South Alviso OH	37-0470L	04-SCL-237-6.10	San Jose	CIP/PS Box Gir	6	436
32	1958	5/24/77	156/101 Sep.	43-0031	05-SBT-156-3.02	Hollister	Steel Gir	6	326
33	1968	12/20/95	Pfeiffer Canyon	44-0060	05-MON-1-45.52	Big Sur	CIP/PS Box Gir	3	317
34	1969	8/30/95	Crowley Lake	47-0048	09-MNO-395-R13.93	Tom's Place	RC Box Girder	2	203
35	1979	8/4/93	Cholame Creek	49-0036	05-SLO-46-54.77	Parkfield	RC Slab	5	128

#	Built	Installed	Bridge Name	Bridge No.	Post Mile	Location	Type	Spans	Length
36	1984	10/26/95	San Simeon Creek	49-0046	05~SLO-1-52.92	San Simeon	CIP/PS Box Gir	4	423
37	1964	6/26/98	Lebec OC	50-0270	06-KER-5-1.61	Los Angeles	RC Box Girder	4	299
38	1966	2/22/96	Brown Road	50-0340	09~KER-395-R25.06	Inyokern	RC Box Girder	4	282
39	1973	3/22/95	South Mojave OH	50-0402	09-KER-14-15.32	Mojave	CIP/PS Box Gir	4	619
40	1984	9/2/96	San Roque Canyon	51-0104	05-SB-192-1.77	Santa Barbara	CIP/PS Box Gir	3	448
41	1960	9/4/97	Cuyama	51-0066	05-SB-1-R69.94	Cuyama	RC Box Gir	7	560
42	1968	5/15/00	El Jaro Creek	51-0090	05-SB-1-R6.78	Lompoc	RC Box Gir	5	401
43	1961	5/24/95	Telephone Road	52-0214	07-VEN-101-R26	Ventura	RC Box	4	204
44	1993	6/1/96	Arroyo Simi OH	52-0331L	07-VEN-023/118-21.	Moorpark	CIP/PS Box Gir	6	1360
45	1964	4/27/94	San Gabriel River	53-1185	07-LA-405-0.02	Los Angeles	RC Box Gir	5	390
46	1962	10/22/81	Vincent Thomas Br.	53-1471	07-LA-47-0.86	Long Beach	Suspension	27	6026
47	1963	9/30/93	SW Conn. OC	53-1630G	07-LA-405-29.43	Los Angeles	RC Box Gir	10	1307
48	1965	12/9/94	Barrel Springs	53-1794	07-LA-14-R57.37	Palmdale	RC Box Gir	5	444
49	1973	5/1/96	Rte 118/210 Sep	53-2102G	01-LA- 118/210-6.0	Pasadena	CIP/PS Box Gir	10	1665
50	1974	3/31/94	East Conn. OC	53-2318G	07-LA-134-R13~25	Pasadena	RC Box Gir	12	1684
51	1994	11/1/94	La Cienega	53-2791	07-LA-10-8.8	Los Angeles	CIP/PS Box Gir	6	776
52	1994	12/20/95	14/5 Sep/OH Ramp	53-2795F	07-LA-14~24.5	Newhall	CIP/PS Box Gir	9	1582
53	1994	12/20/95	14/5 Sep/OH Ramp	53-2797F	07-LA-14-24.5	Newhall	CIP/PS Box Gir	8	1298
54	1989	12/18/92	15/215 Sep.	54-0783R	08-SBD-15-16.35	Devore	CIP/PS Box Gir	2	334
55	1966	11/10/92	Northwest Conn.	54-0823G	08-SBD-215-4.05	Colton	CIP/PS Box Gir	16	2540
56	1962	6/21/99	Via California	55-0225	12-ORA-5-6.62	Capistrano	RC Box Gir	6	441
57	1961	12/16/92	60/10 Sep.	56-0452F	08-RIV-10-6.67	Beaumont	RC Box Gir	4	320
58	1962	6/30/93	62/10 Sep.	56-0474G	08-RIV-62-0.00	Palm Springs	Steel Gir	4	338
59	1989	9/29/94	15/91 Interchange	56-0586G	08-RIV-15-R41.57	Corona	CIP/PS Box Gir	12	1600
60	1969	11/17/93	San Diego Toll Br.	57-0857	11-SD-75-R20.49	Coronado	Steel/Ortho	32	7826
61	1966	7/4/96	Ardath Road Via.	57-0520L	11-SD-52-0.19	La Jolla	CIP/PS Box Gir	17	1763
62	1971	4/26/78	Meloland Rd. OC	58-0215	11-IMP-8-R44.04	El Centro	RC Box Gir	2	208
63	1967	4/3/86	BART Elevated Struct.	BART	-	Hayward	PS Box Girders	3	77

PEQIT investigators should be aware of bridges with special features such as those with accelerometers. Your observations may be the only correlation available between recorded performance and the condition of the bridge. Take extra time to record everything of relevance to instrumented bridges.

DOWNHOLE ARRAYS

#	Built	Installed	Bridge Name	Bridge No.	Post Mile	Location	Type	Spans	Length
1	1971	8/30/95	Samoa Channel	04-0228	01-HUM~255~1.2	Eureka	Soil	20	2506
2	1973	Underway	Rohnert Park	20-0235	04-SON-101-13.88	Rohnert Park	Soil	2	282
3	1962	11/01/00	Tunitas Creek	35-0031	04-SM-1-20.82	Half Moon Bay	Soft Rock	6	421
4	1967	Underway	San Mateo Bridge E/W	35-0054	04-SM-92-14.44	Hayward	Soil	908	36069
5	1982	6/3/96	Dumbarton Toll Br.	35-0038	04-SM-84-29.0	Fremont	Rock	85	8600
6	1993	Underway	Arroyo Simi OH	52-0331L	07-VEN-023/118-21.0	Moorpark		6	1360
7	1994	5/14/97	14/5 Sep/OH (Ramp C)	53-2795F	07-LA-14~24.5	Newhall	Pile	9	1582
8	1962	9/10/98	Vincent Thomas Toll Br E/W	53-1471	07-LA-47-0.86	Long Beach	Soil	27	6026
9	1965	Underway	Barrel Springs	53-1794	07-LA-14-R57.37	Palmdale	Rock	5	444
10	1994	12/15/94	La Cienega	53-2791	07-LA-10-8.8	Los Angeles	Soil	6	776
11	1966	Underway	Northwest Conn E/W	54-0823G	08-SBD-215-4.05	Colton	Soil	16	2540
12	1989	underway	15/91 Interchange	56-0586G	08-RIV-15-R41.57	Corona		12	1600
13	1971	2/11/99	Meloland	58-0215	11-IMP-8-R44.04	El Centro	Soil	2	208

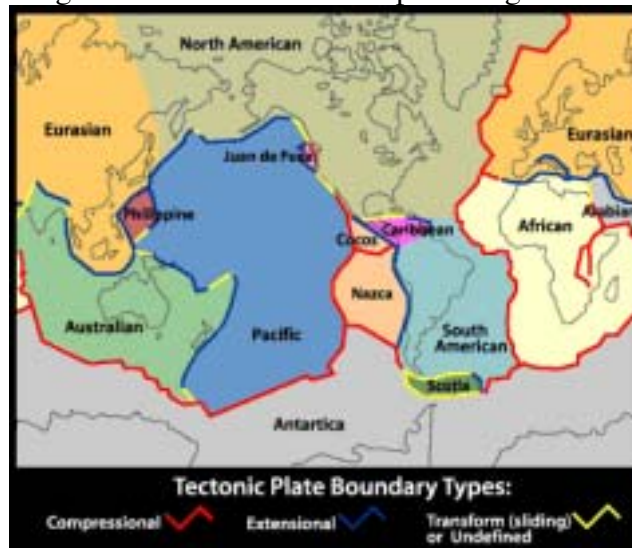
Downhole arrays allow engineers to study how the rock motion propagates to the ground surface and then shakes structures like bridges.

EARTHQUAKES

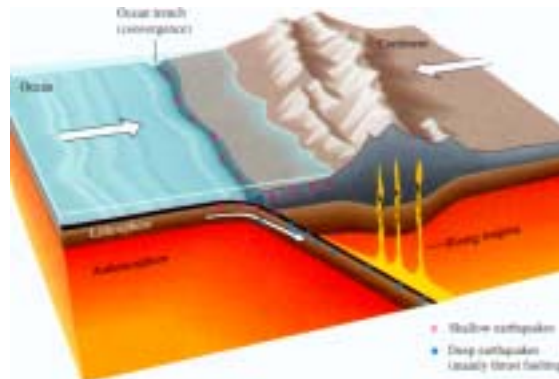
Sources of Earthquakes

Most earthquakes occur on faults at the boundaries of tectonic plates, especially in California. As the plates move, the faults become stressed until one suddenly ruptures, causing an earthquake. Plates move a few millimeters to centimeters in a year and it requires a few centimeters to meters of movement before an earthquake occurs.

There are different types of faults, reflecting the behavior of the prevailing tectonic forces. The figure below shows the earth's lithosphere divided into tectonic plates. The plate boundaries may be pushing together (compression or convergent boundaries), pulling apart (divergent or extensional boundaries), or sliding against each other (sliding or transform boundaries). Faults do not always follow the expected behavior from the global tectonic model due to significant local variation of prevailing forces.

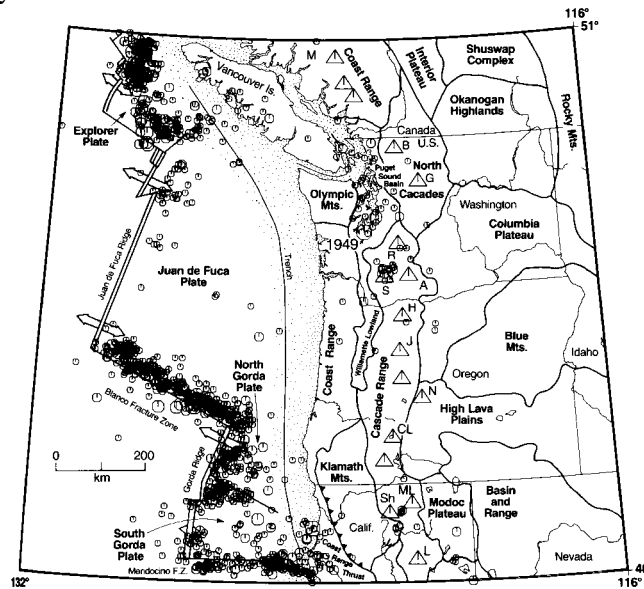


Compressional plate boundaries are where heavy oceanic plates collide with lighter continental plates; pushing the oceanic plate downward and causing thrust faulting. Compression against the continental plate forms mountains and the ensuing friction melts rock causing volcanoes. An example is along the coast of Northern California, Oregon, and Washington State where the Juan de Fuca and Gorda Plates are being pushed under the North American Plate.

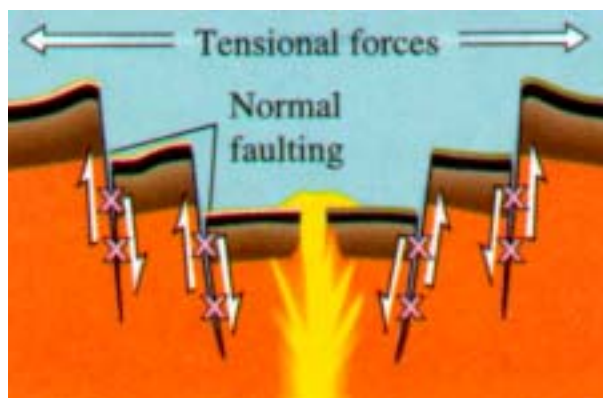


Compressional boundaries cause thrust faults.

This has created a string of volcanoes (shown with triangles in the figure below) along the Cascadia Mountain Range and it has also caused a series of moderate earthquakes (shown with circles). Globally, earthquakes in these 'subduction-zones' are responsible for about 90% of the seismic energy released by earthquakes and it is believed that the Cascadia Subduction Zone is capable of producing a very large earthquake which could devastate the Northwestern United States. However, this is an area of very low seismic activity for California, but the potential of a large earthquake with an MCE magnitude of 8.5 exists and is considered by Caltrans.



Extensional boundaries are where adjacent plates move apart. This occurs at spreading ridges between oceanic plates and at rift zones between continental plates. An example of an extensional boundary is on the west side of the Gorda and Juan de Fuca plates (shown above). Earthquakes occurring at extensional boundaries are shallow and smaller than at compressional boundaries.



Extensional boundaries cause normal faults.

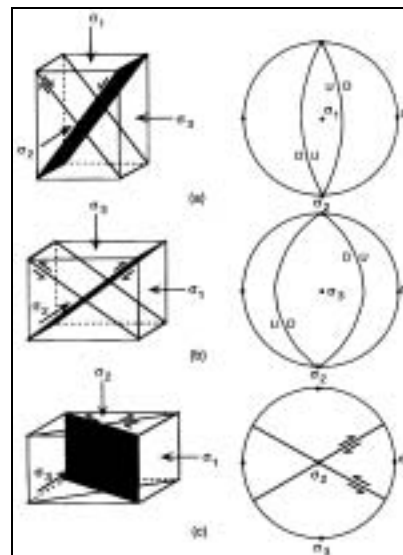
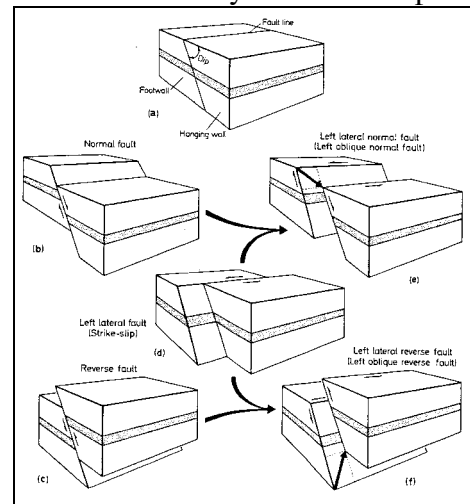
In California we are most familiar with the sliding action of the transform boundary between the Pacific and North American Plates. This has created many long strike-slip faults such as the San Andreas. We can also see transform fault zones between the extensional faults on the west side of the Juan de Fuca and Gorda fault ridges.

During actual earthquakes, faulting can be considerably more complicated depending on the state of stress in the earth's crust. The figures below show how normal faulting (b) can be combined with strike-slip faulting (d) to create an oblique normal fault. Similarly, reverse (or thrust) faulting (c) can be combined with strike-slip faulting to cause an oblique reverse (or thrust) fault. Faults are left or right lateral based on the movement of the rock on the other side of the fault from where an observer is standing. Figure (a) shows some of the features of a fault, such as the fault line (or trace), the fault dip, the footwall extending under the dipping fault, and the hanging wall extending above the fault (a thrust fault is a reverse fault where the dip angle is less than 45° and the fault line often does not reach the ground surface).

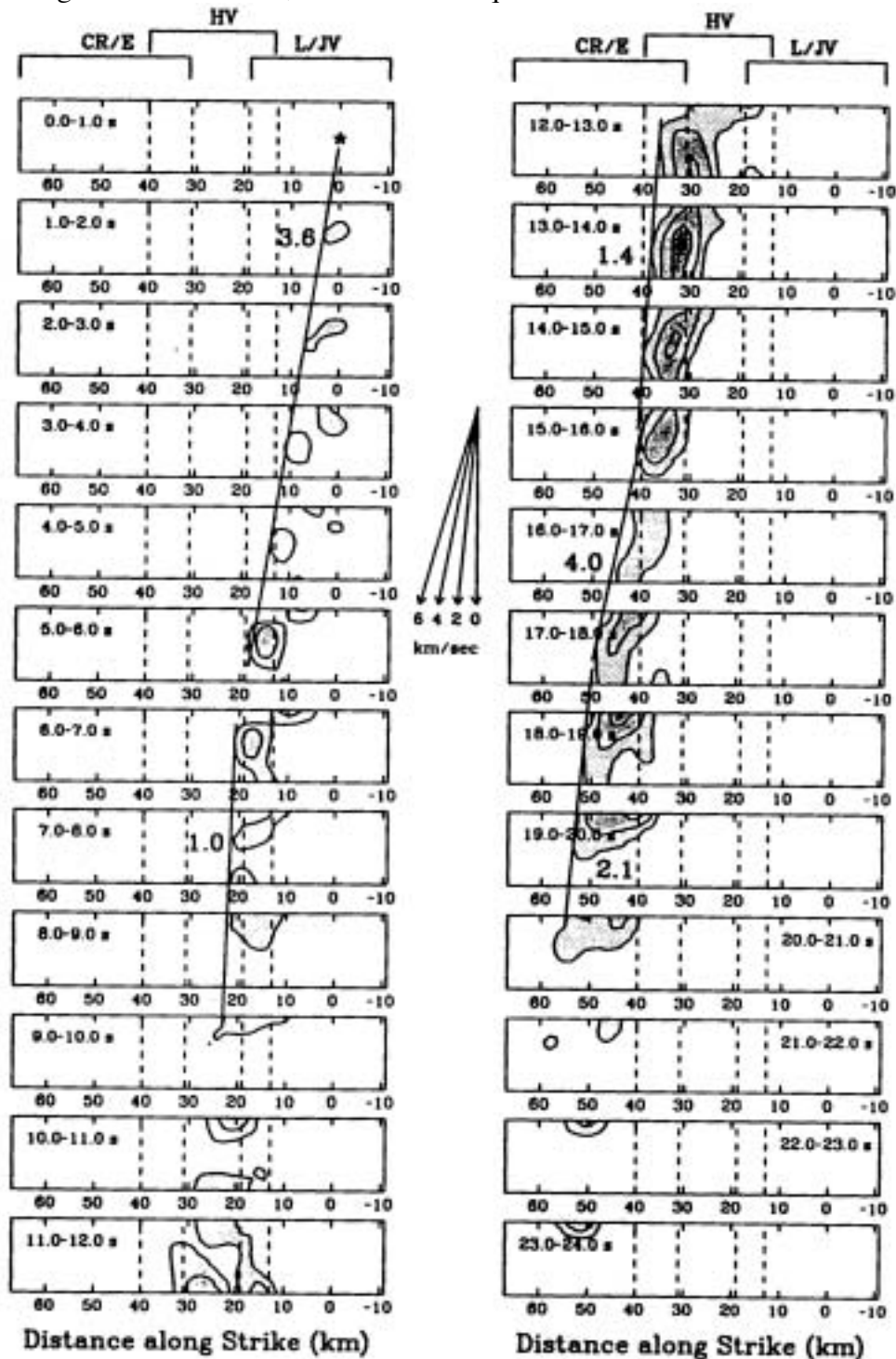
The drawing on the right shows stress blocks and stereographic projections of the maximum shear-planes in relation to principal stresses for a normal (a), reverse (b), and strike-slip (c) fault. The normal fault (with the hanging wall moving downward) occurs when the maximum principal compressive stress is vertical while a reverse fault (with the hanging wall moving upward) occurs when the minimum principal stress is vertical. However, pre-existing planes of weakness usually determine the location of the fault-plane rather than these models of isotropic material. However, the next section (on seismic waves) shows some additional uses for these 'beach-ball' diagrams.



Transform boundary and strike-slip fault.



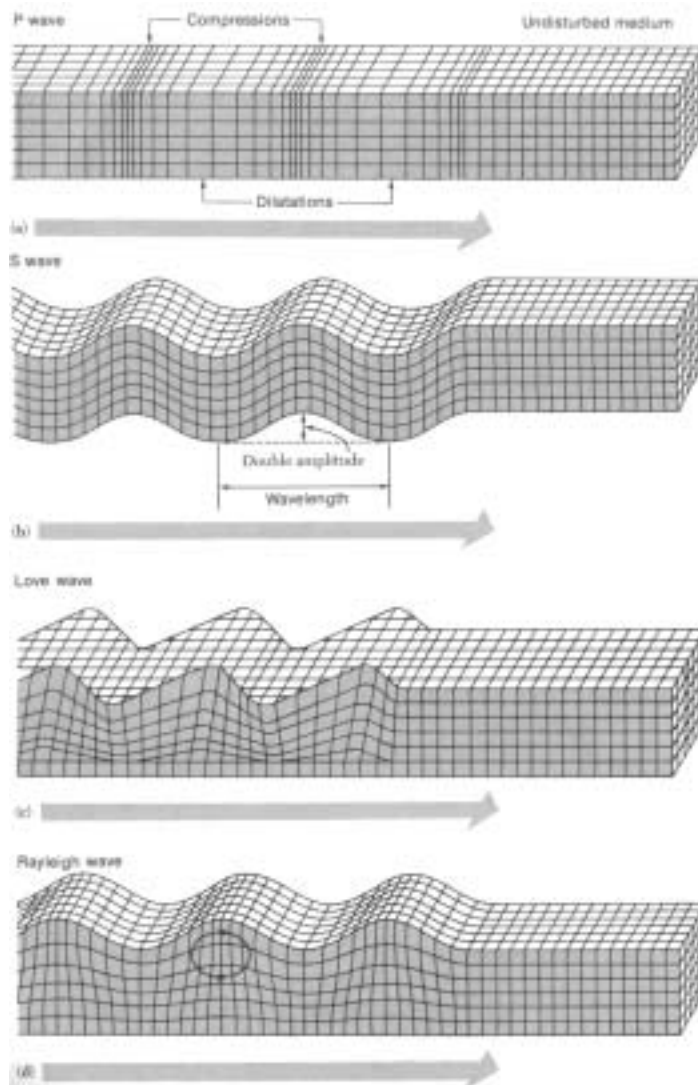
A rupture will suddenly relieve the accumulated stress at a fault and cause an earthquake. The direction and velocity of the rupture has gained considerable attention to engineers because these 'velocity pulses' can cause very large, long period motion that may knock over a bridge. The figure below shows the movement of a rupture 'front' along the Camp Rock/ Emerson Faults to the Homestead Valley Fault to the Landers/Johnson Valley Faults during the 1992 Landers, California earthquake.



Seismic Waves

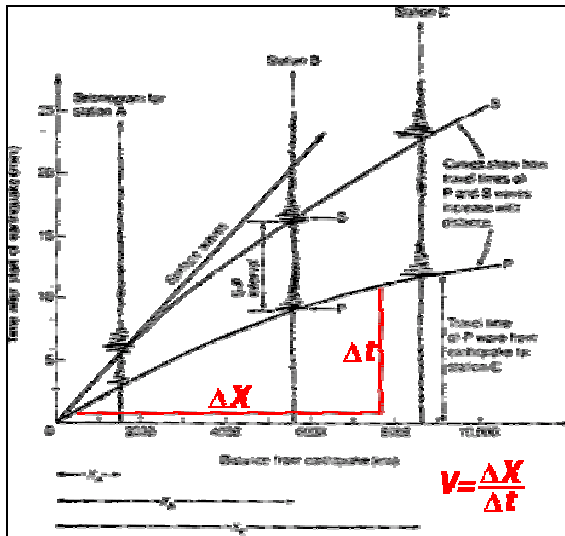
The fault rupture produces a series of waves moving out from the source. These waves cause the ground motion we feel during an earthquake. The compressive (or P) wave is the fastest wave at speeds between 1.5 and 8 kilometers per second through rock. It alternately pushes and pulls the ground in the direction of its motion. Next come the slower shear (or S) waves moving perpendicular to the direction of motion. P and S waves are called body waves because they propagate in a body of rock.

There are two slower waves called surface waves because they're confined to the ground surface. Love waves are similar to shear waves but without a vertical component of motion and the slowest Rayleigh waves move similar to ocean waves vertically and longitudinally in a retrograde motion along a vertical plane in the direction of travel.



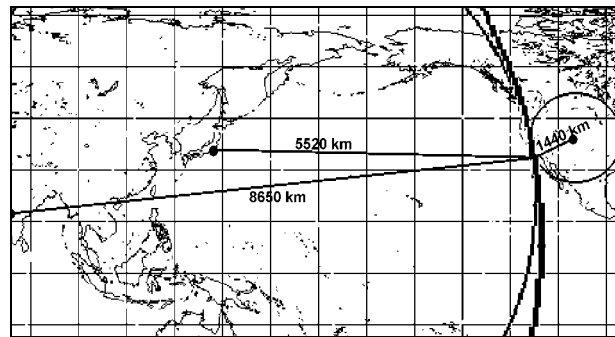
All of these waves, but particularly the shear waves, can damage structures. In fact, the worst damage occurs when geologic or topographic conditions amplify the waves at a bridge site. Moreover, the length and frequency of the waves plays a role in the characteristics of the ground motion. For instance, long bridges are damaged when adjacent bents are at the peak and trough of a wave resulting in out-of-phase motion. Certain soils are sensitive to long or short shear-wave velocities and can create resonance for structures with similar sensitivities.

Although wave speeds vary, the ratio between the average speed of a P wave and the following S wave is approximately constant. This fact enables seismologists to use the delay between the arrival of the P wave and the arrival of the S wave to get a quick estimate of the distance of the earthquake from the observation station. By multiplying the S-minus-P (S-P) time, in seconds by the factor 8 km/sec (5 miles/sec) will provide the approximate distance in kilometers from the earthquake source.

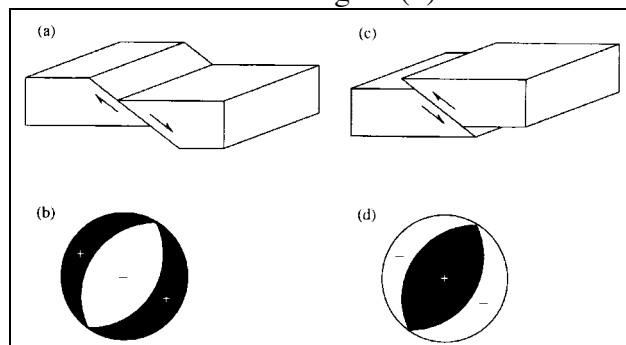


For instance, Station A has a separation of three minutes or 180 seconds between the P and S wave for a distance of 1440 km. Station B has 11.5 minutes or 690 seconds between the P and S waves for a distance of 5520 km from the source. Station C has 18 minutes or 1080 seconds between the arrival of the P and the S wave for a distance of 8650 km from the source. We can precisely locate the source of an earthquake from three recordings by drawing circles using the distances computed above as radii. Where the three circles intersect is the location of the earthquake.

For instance, if Station A is in Denver, Colorado, Station B is in Tokyo, Japan, and Station C is in New Delhi, India the intersection of circles drawn around these locations (and with radii derived above) would be Los Angeles, California. However, the error can be considerable, even for California's dense network.



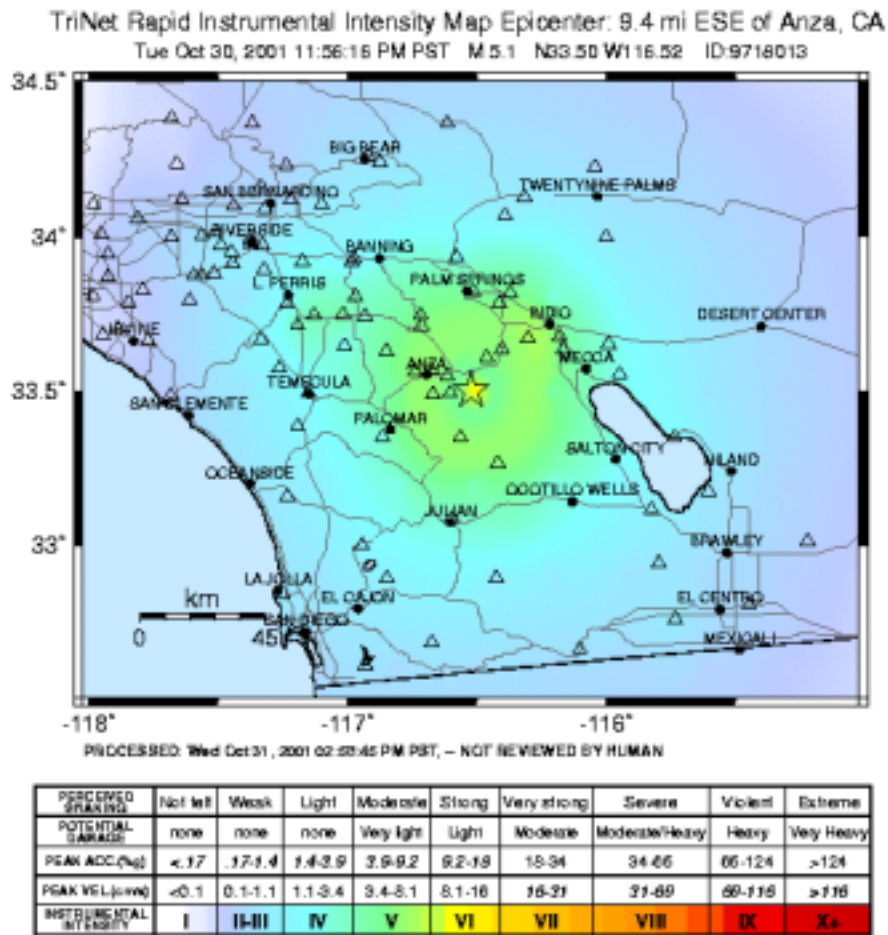
Seismograms have many other uses. For instance, a better way of deriving the stereographic projection of the fault plane is by mapping locations where the first P wave is dilatational (pulling) or compressional (pushing). Figure (b) shows dilation as white and compression as black for a normal fault and Figure (d) shows the areas for a thrust fault.



The Size of an Earthquake: Intensity and Magnitude

In the 19th century, the intensity of an earthquake was determined from the severity of damage at different sites. Isoseismal maps were created showing areas of equal intensity based on interviews with local residents and a survey of the damage. Intensity is measured

today using the Modified Mercalli Scale that relates damage to the peak ground acceleration (as shown below). This is not a measure of the size but of the effects on buildings and on common structures.



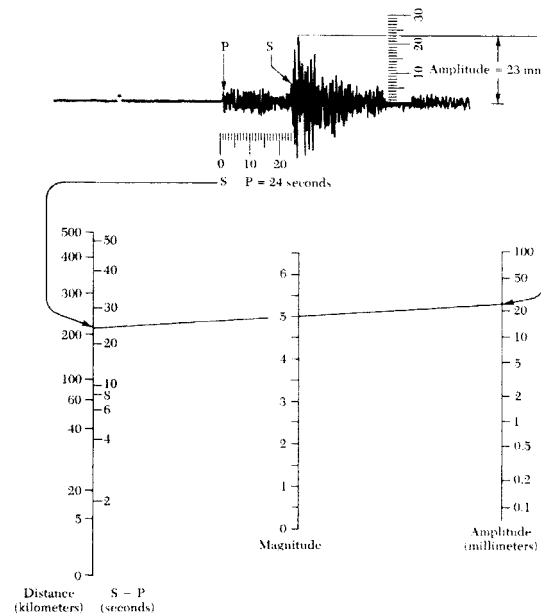
However, seismologists required a scale that could be used to compare the size of different earthquakes. Charles Richter developed the 'size' idea (in 1935) by using local magnitude (M_L) to measure earthquakes. Richter defined local magnitude as the base 10 logarithm of the maximum seismic wave amplitude (in thousandths of a millimeter) recorded on a standard seismograph at a distance of 100 kilometers from the earthquake epicenter. The standard seismograph had a mass suspended from a torsional spring that recorded the incoming waves as a function of time and of amplitude in millimeters. A logarithmic scale was used to make the magnitude a single digit number. Thus, when the amplitude of the waves increased by ten, the magnitude would increase one unit (from magnitude 4 to magnitude 5 - $10^5/10^4 = 10$). The following table shows how local magnitude is calculated from a seismograph of an earthquake but there are several modified or equivalent methods in use today.

Step 1: Measure the distance to the initial point of rupture from the time interval between S and P waves ($S - P = 24$ sec.).

Step 2: Measure the maximum wave amplitude on the seismograph (23 millimeters).

Step 3: Place a straight edge on the right using the previously derived distance (24 sec) and amplitude (23 mm) to obtain the local magnitude ($M_L = 5.0$).

Local magnitude was meant to measure earthquakes in Southern California. As acceptance of the magnitude scale grew, problems using the local magnitude were recognized by seismologists.



To obtain uniformity when measuring earthquakes, moment magnitude (M_W) was developed (shown below).

$$M_W = (2/3)[\log(M_0) - 16.05]$$

M_0 is the equivalent seismic moment at the source as the two sides of the fault move in opposite directions during the earthquake

$$M_0 = GAD \quad (\text{in dyne-cm})$$

where 'G' is the shear modulus of the rock, 'A' is the area of the fault, and 'D' is the average slip or movement of the fault.

The maximum earthquake magnitude that can occur on a fault is related to the product of the fault length times its width (A, in cm^2) and the average slip (D, in cm). Caltrans uses the fault area and style of faulting in addition to other criteria to determine the moment magnitude of the maximum credible earthquake (MCE).

TYPICAL EARTHQUAKE INDUCED BRIDGE DAMAGE

Much of the bridge damage that occurs during earthquakes is a result of soil problems. Unstable soil can cause landslides and loose alluvium can settle or liquefy. Shaking of the bridge itself can cause failure of bridge members and connections or can cause excessive movement at expansion joints dropping bridge spans. There are also a variety of secondary effects such as surface ruptures occurring directly under a bridge, or tsunamis, avalanches, etc. During the 1958 Hebgen Lake earthquake in Montana, an enormous landslide changed the course of the Madison River causing floods that washed away several bridges. Bridges are sometimes damaged due to failure of nearby lifeline components. Broken water mains can wash away abutments, broken gas lines can incinerate bridges, and fallen buildings or other structures can damage and close bridges. On the following pages are examples of typical types of earthquake induced damage that have occurred to bridges.

SOIL RELATED BRIDGE DAMAGE**Bridges Supported on Cohesionless Material.**

Struve Slough Bridge after Loma Prieta.

Bridges Supported on Liquefiable Soils.

Rio Vascaya Bridge after 1991 Costa Rica Quake



Approach Settlement on I-118 after Northridge.

Bridges Supported on Sloping Ground



Landslide Damage in the Philippines.

Foundation Damage

Foundation Movement at Kobe.

Abutment Damage

Tilting of Railroad Abutment in Kobe.

FAULT RUPTURE AND SURFACE DEFORMATION



Taiwan Fault Rupture.



Landers Fault Rupture.



Landers Surface Deformations

STRUCTURAL VIBRATION RELATED BRIDGE DAMAGE

Unseating



San Francisco Bay Bridge.



Minatogawa Interchange after Kobe.



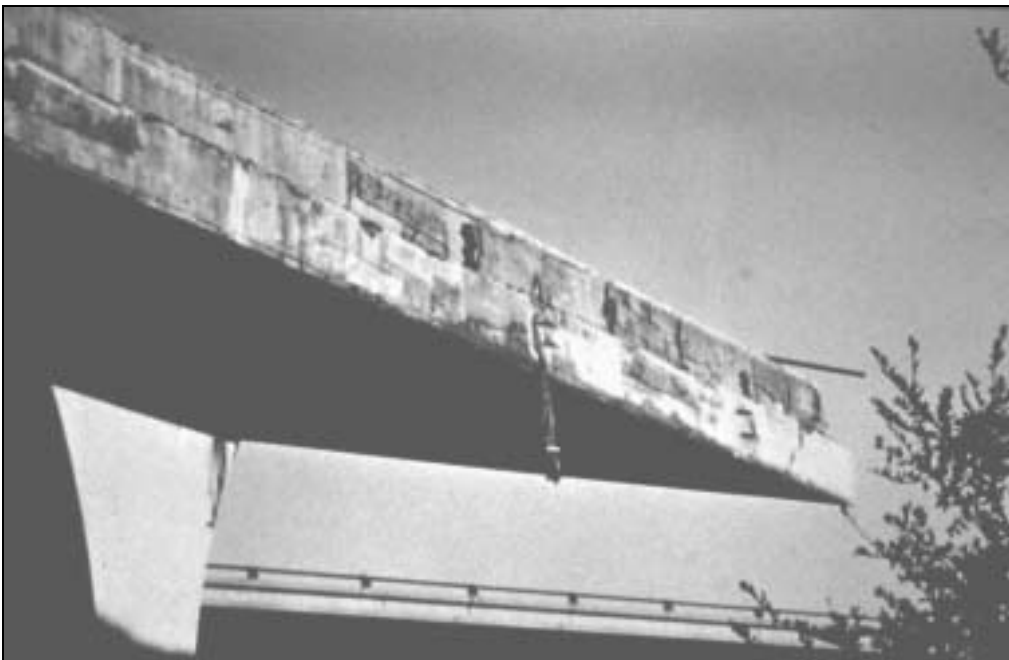
Mission Gothic UC after Northridge.



Gavin Canyon After Northridge.

Expansion Joint, Restrainer, and Shear Key Damage

Expansion Joint Damage.



Restrainer Damage at Gavin Canyon.



Damaged Restrainer.



Broken Restrainers at Nishinomiya.



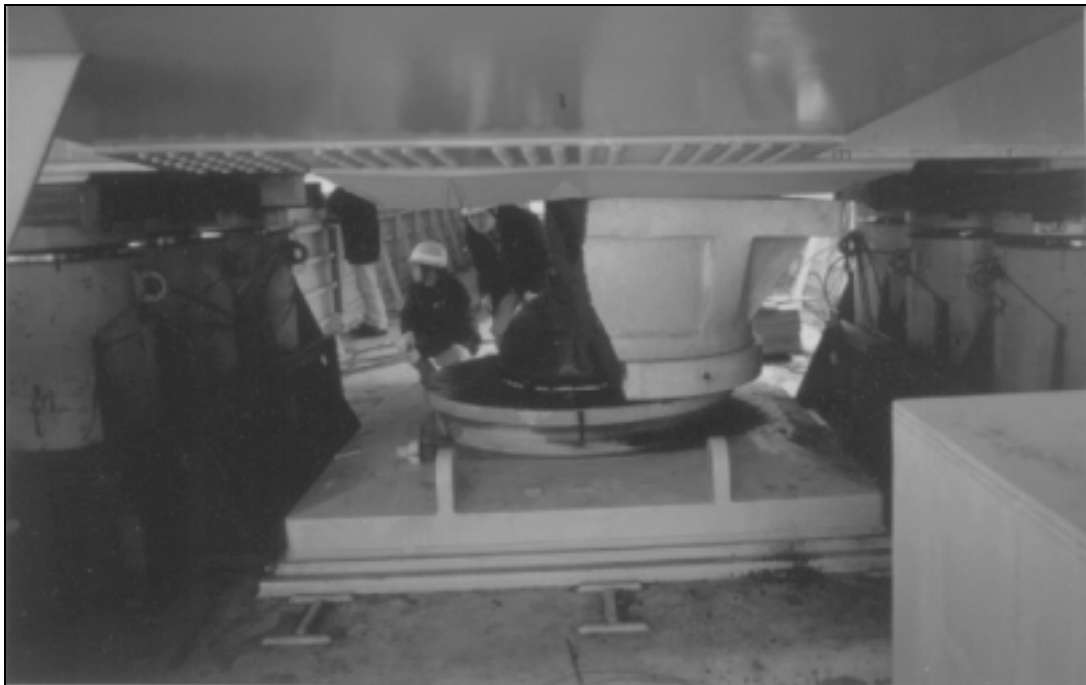
Restrainer Damage in Cell.



Shear Key Damage.

Bearing Damage

Missing Abutment Bearing After Northridge EQ.



Broken Bearing at Nishinomiya-ko Bridge.

Superstructure Damage

Superstructure Collapse on 14/5 Interchange during Northridge.



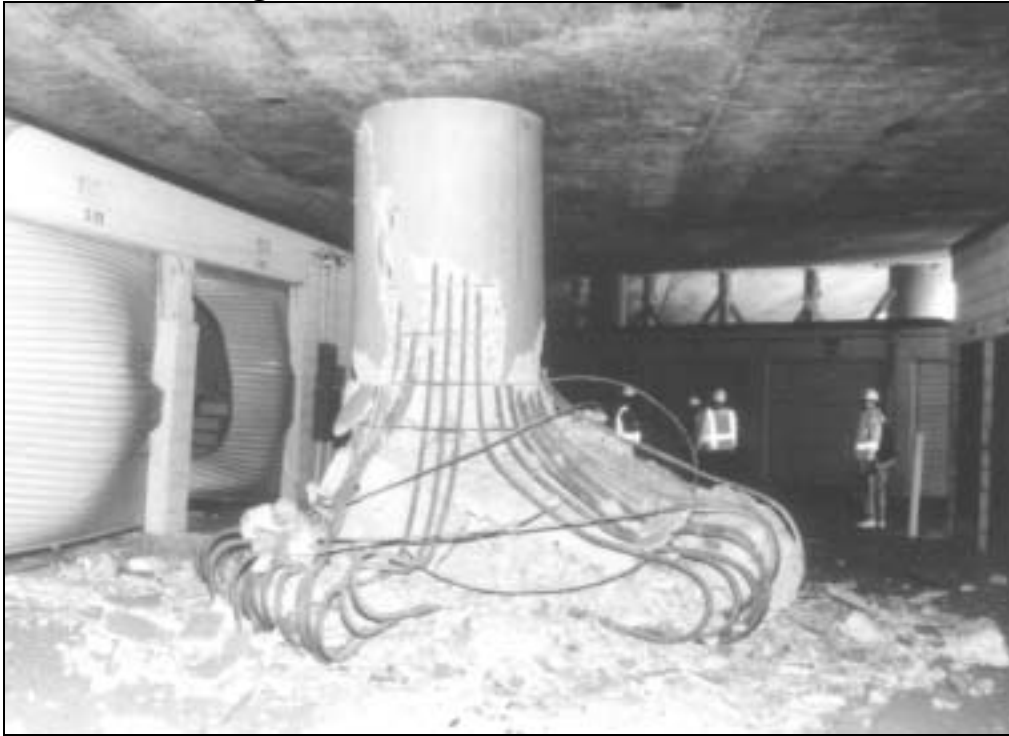
Damage at Takatori.



Napa River Bridge Precast Girder Damage.



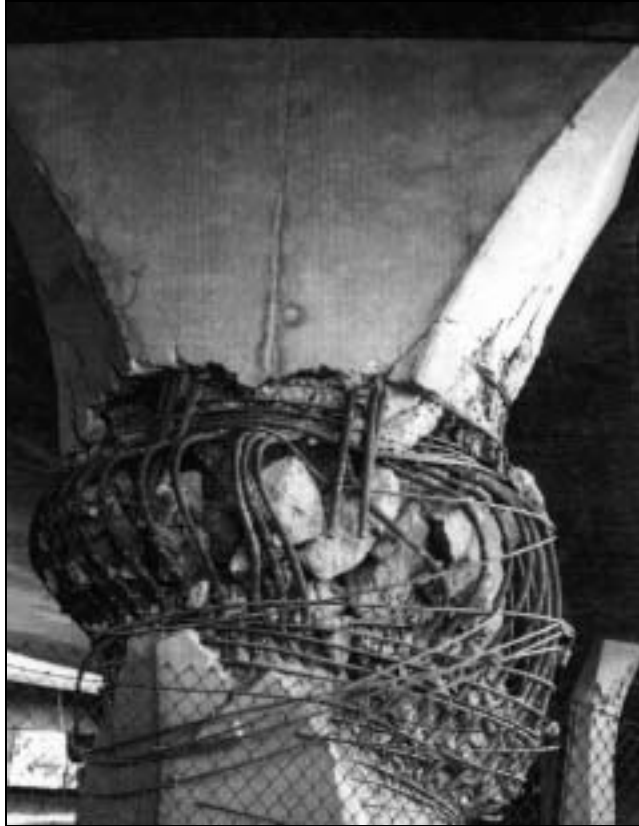
Damage to Rokko Island Bridge During the Kobe Earthquake.

Concrete Column Damage

Damage at Santa Monica Fwy.



Minor Damage to Confined Bridge Column During Northridge EQ.



Column Flare Damage.



Midheight Flexural Damage.



Longitudinal Bar Pullout.



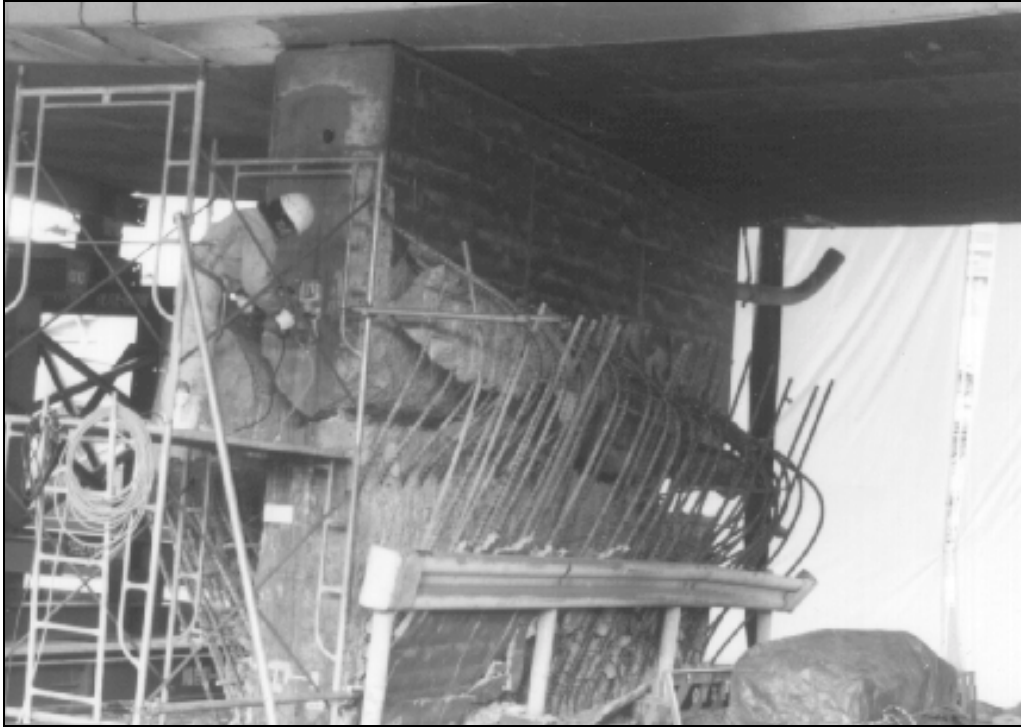
Shear Column Damage During the Kobe Earthquake.



Poor Transverse Reinforcement.



Torsional Column Damage at 5/118 Interchange during the Northridge Earthquake.



Pier Wall Damage after Kobe.



The North Connector on the 14/5 Interchange Collapsed as a Result of Failure of Short, Stiff Pier #2 During the Northridge Earthquake.

Steel Column Damage**Steel Column Damage at Kobe.****Fifth Avenue Overhead after Loma Prieta.**

Connection Damage**Joint Shear Damage.****Cypress Viaduct Damage.**



Kobe Joint Damage

Pounding Damage



Southern Freeway Pounding Damage from Loma Prieta

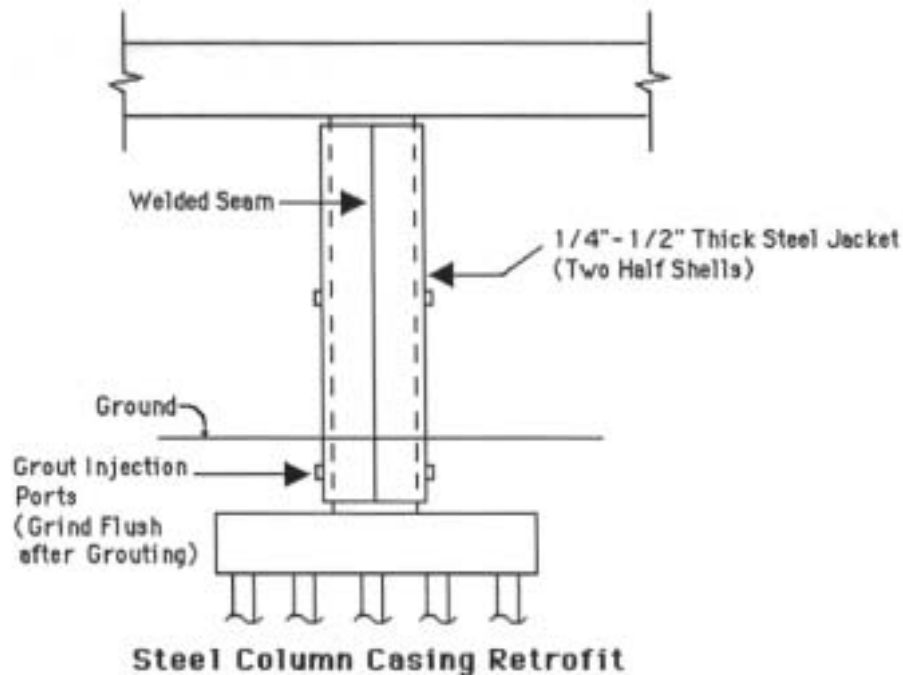
EVALUATING THE EARTHQUAKE PERFORMANCE OF RETROFITTED BRIDGES

California has a large inventory of bridges retrofitted in the 1990's. There are columns wrapped in steel and fiber shells, hinges retrofitted with pipe-seat extenders, and abutments attached to large-diameter CIDH piles. One of the biggest responsibilities of the PEQIT is to evaluate the performance of retrofitted structures. Are there signs that the concrete columns have suffered damage inside the shells? Have the restrainers yielded (Structures maintenance is putting yield indicators on cable restrainers to alert engineers if the cables have yielded)? The PEQIT should carefully examine the retrofitted bridges to determine their performance. Typical (and not so typical) retrofits are shown below.

Caltrans Bridge Retrofit Program:

Not only are retrofits available for different bridge elements but they can be categorized by their ability to modify the strength, stiffness, ductility, or damping of bridge members. The following pages provide a sampling of some of these retrofits.

Bent Retrofits



The most common retrofit procedure for vulnerable columns is to wrap them in a steel shell. Steel shell retrofits are divided into two classes. A class F retrofit is when the space between the shell and the column is grouted to allow the columns to form plastic hinges during the earthquake. The class P retrofit is when the annulus is filled with compressible polystyrene that allows the columns to form pins. The class P retrofit protects the columns without the expense of having to design the entire bridge for the plastic column moment and shear. The class F retrofit greatly increase the ductility and shear capacity while adding only about 10% to the flexural strength of the columns. This has made them very popular and they are used in many situations. Sometimes, a short steel shell is just placed around a vulnerable area of the column. Steel shells are often used on rectangular columns that are so wide that the shells must

be restrained with bolts or wide flange beams. Steel shells have even been used on nonprismatic columns and column flares.



Non-Prismatic Column with Steel Shell.

A variety of other materials have been developed to provide ductility to existing concrete bridge columns. The figure below shows a fiberglass wrapped column near Griffith park in Los Angeles after the Northridge earthquake. Composite material retrofits are now used in many of the same situations as steel shells. The one exception being that if a plastic hinge is required in a region with a lap splice, only steel shells provide enough confinement to prevent slip. However, composite fibers can safely be used when a class P retrofit is needed.



Griffith Park OC with Fiberglass Wrapped Concrete Columns.

There are many other materials and techniques used to provide confinement and increased ductility for concrete columns. These include carbon-fiber wrapped columns, wire wrapped columns, and concrete encased columns. However, because of unfamiliarity with some of these materials, a cautious approach should be adopted in their use.

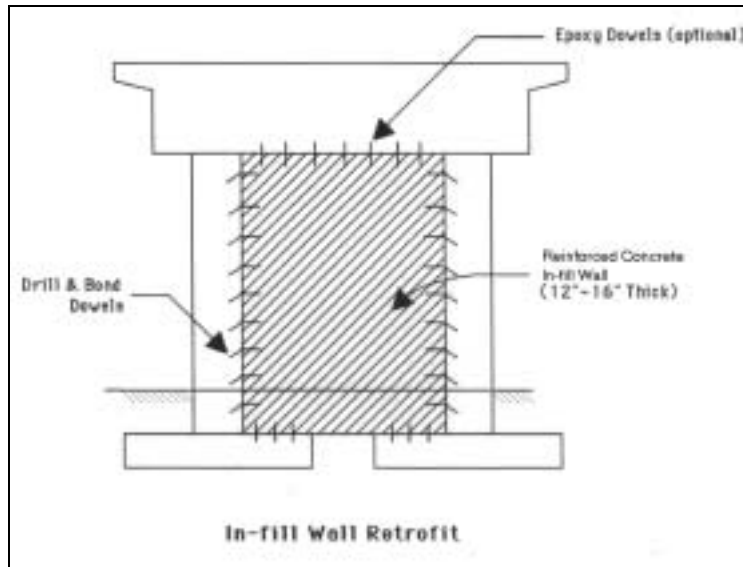
Bents are often retrofitted to increase their strength. A very popular retrofit for weak single column bents and pierwalls has been to built an outrigger bent cap and add pileshafts to the bent. Sometimes a single pileshaft is added to provide more strength but usually pileshafts are placed on each side of the bent. These retrofits may be used when the soil may liquefy and deep pileshafts can continue to support the structure. Or they may be used when a steel shell cannot provide enough displacement capacity to make the bent survive the earthquake.



Outrigger Pileshaft Retrofit for Pier Wall.

The figure above shows a pier wall with an outrigger pileshaft retrofit. Note that the pier wall also has a steel shell that allows it to continue provide support during the earthquake. The advantage of the outrigger pileshaft retrofit is that it provides a great deal more ductility and flexural strength without appreciably increasing its stiffness.

Another popular retrofit provides increased strength in both directions and increased transverse stiffness. These in-fill wall retrofits are an inexpensive method of protecting multicolumn bents. Dowels are drilled and bonded to the existing concrete (as below), reinforcement is placed between the columns, and new concrete is poured turning the multicolumn bent into a pier wall.



The ability to provide increased strength and stiffness in a particular direction is accomplished by attaching triangular shear walls to existing bents. These have been particularly popular for pedestrian overcrossings whose wandering geometry creates a center of mass far from the center of stiffness. Moreover, the single column bents for these delicate structures are usually incapable of handling earthquake forces. The shear wall is either placed to be normal to the curve or, as in this case, a wall is provided in two directions.



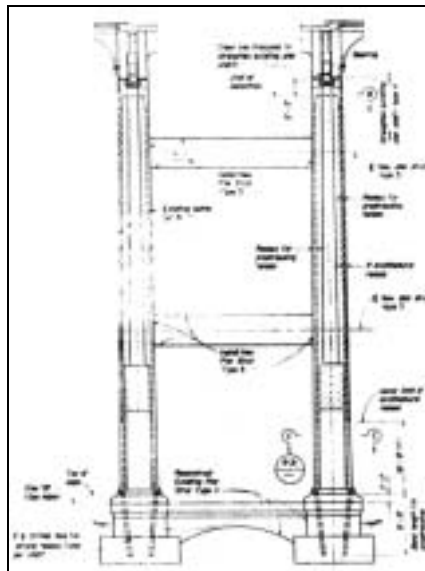
Triangular Shear Walls.

Isolation devices are often used to modify a bent's behavior during earthquakes. This is particularly effective for a stiff bent which is part of a flexible structure. We will look at this in more detail in the section on bridge system retrofit strategies. Another possible retrofit for bents is replacement. Sometimes a vulnerable portion of the bent will be replaced like an existing bent cap or connection. Often, a completely new bent is provided. Sometimes a single column will be used to support two structures. This can occur for double-deck viaducts or at interchanges. Since it would be exceedingly difficult for this column to survive a large earthquake, it is replaced with a separate column for each structure.



Link Beam Retrofit at the Santa Monica Freeway.

The use of link beams on multicolumn bents has been particularly effective. This method is used for very flexible columns that are too weak to handle large displacements. Link beams stiffen the bent and reduce the displacement. The figure above shows a link beam retrofit on the Santa Monica Expressway. Link beams can be designed to be weaker than the columns but to have great ductility. As the bent displaces transversely, the beams can absorb energy and protect the columns.

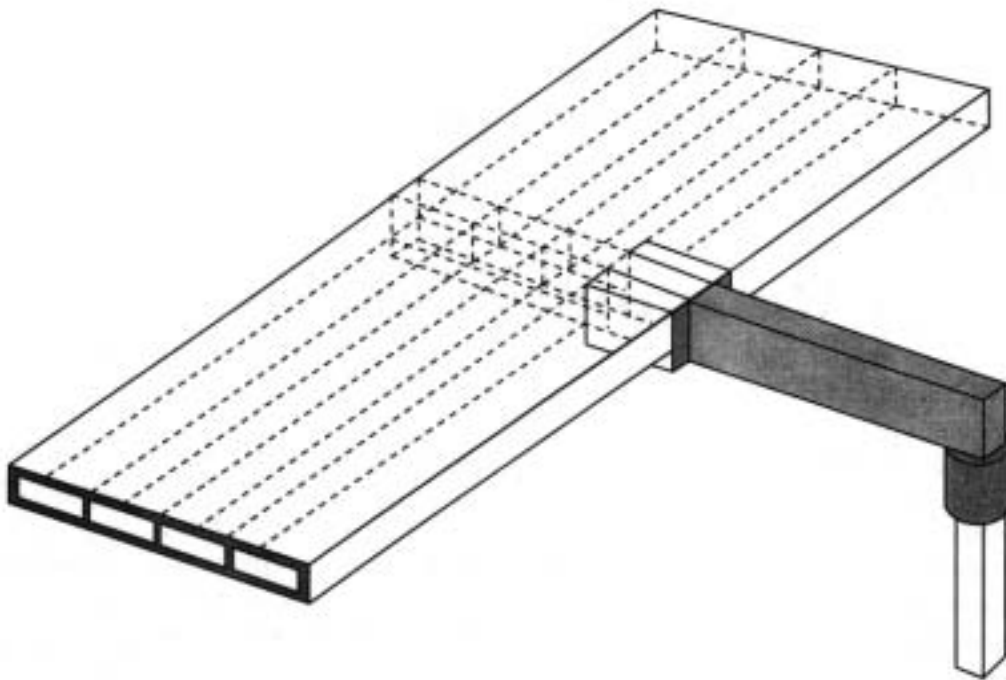


Link Beam and Post-Tensioned Column Retrofit.

Sometimes, the columns can be post-tensioned to provide them with added flexural and shear strength. This was done for the Colorado Street Bridge in Pasadena which had extremely weak columns with almost no reinforcement. A geology drilling unit was set up on the bridge deck and drilled straight down through the existing columns. Then prestressing strands were placed in the holes and post-tensioned. Also, link beams were added to stiffen the bents.

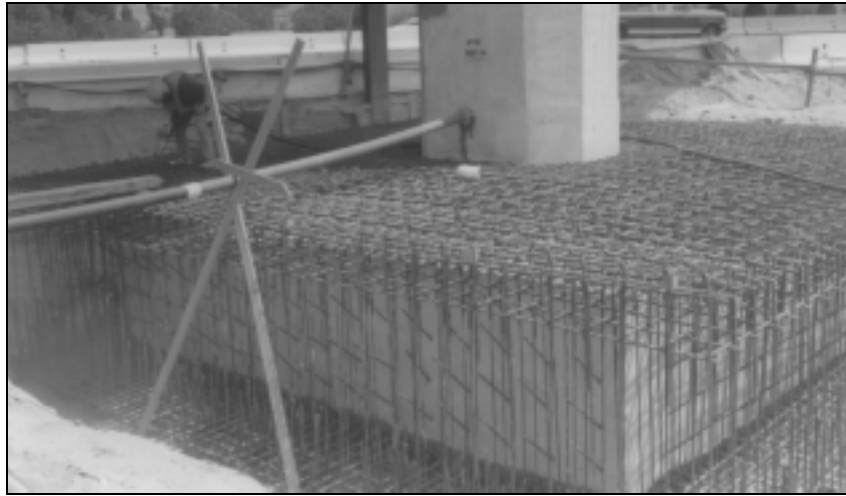
Steel bents have also been retrofitted. A common retrofit is to add steel plates to the flanges of steel bents. This increases their strength without adding much additional stiffness. Encasing steel bents in concrete is another alternative.

The preceding discussion is just a small sampling of the many bent retrofits that have been done in recent years. Most of these retrofits were the result of research and testing. Pier wall steel shell retrofits were investigated at UC Irvine. Most of the composite shell and link beam retrofits were tested at UC San Diego. UC Berkeley (Stojadinovic, 1995) has been looking at retrofitting Outrigger knee joints. Currently, older knee-joint connections have been removed and replaced with larger, more ductile joints. The testing program looked at the behavior of both long and short bent caps. A ductile retrofit and a strength retrofit strategy was studied using both a steel jacket and a post-tensioned reinforced concrete jacket. The final recommendation is for a strength retrofit using a steel plate jacket that forces plastic hinging in the column for both longitudinal and transverse motion. The figure below shows a retrofit which is composed of a concrete bolster that strengthens the connection to the superstructure, a steel plate jacket around the bent cap and the joint, and steel casing around the column.



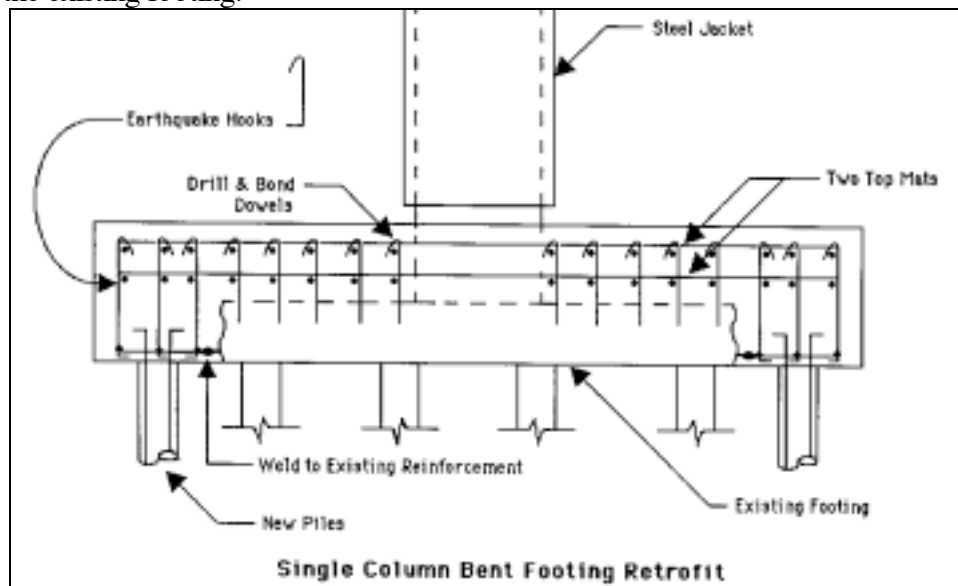
Final Recommended Knee-Joint Retrofit.

Foundation Retrofits



Reinforcement For Footing Retrofit.

If the columns are strengthened or the footing is found to be inadequate, then a footing retrofit is required. This is often the case for single column bents that are fixed for moment. Sometimes the existing footing has no top mat of reinforcement, no ties to join the top and bottom mats, inadequate piles (particularly for tension), and too small a section for shear and flexure. The retrofit shown below may have additional piles driven around the footing perimeter and additional reinforcement and concrete placed around the existing footing. Drill and bond dowels connect the new footing to the old. These are designed to handle the shear friction at the interface. A beam is designed above the existing footing that must be strong enough to handle the moment and shear of the column being transferred to the piles on each side of the existing footing.



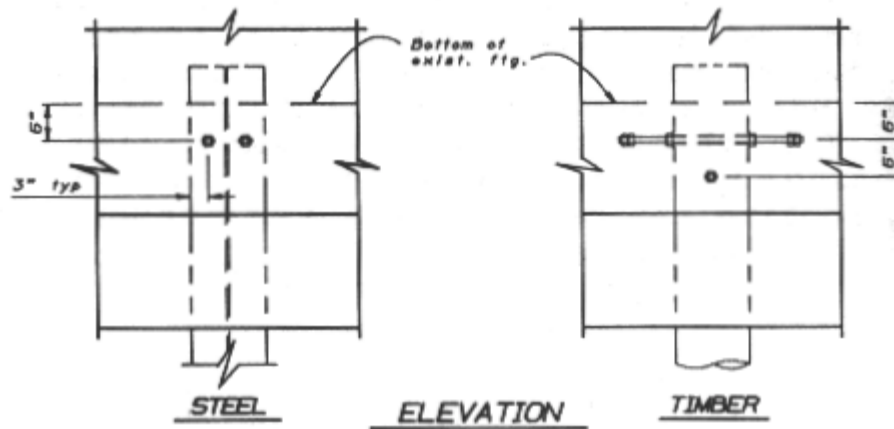
One of the problems that confronts engineers is the inability of many piles to act in tension as the foundation rocks back and forth. Both timber and steel piles (which are strong in tension) have very poor connections to the footing, older concrete piles have inadequate reinforcement, and many piles have inadequate friction to engage the surrounding soil. These

problems have resulted in a number of innovative foundation retrofits. Sometimes holes are drilled through the existing footings and tie-down anchors are placed and grouted in the holes.



Tie-Down Rods being Connected to Existing Footing.

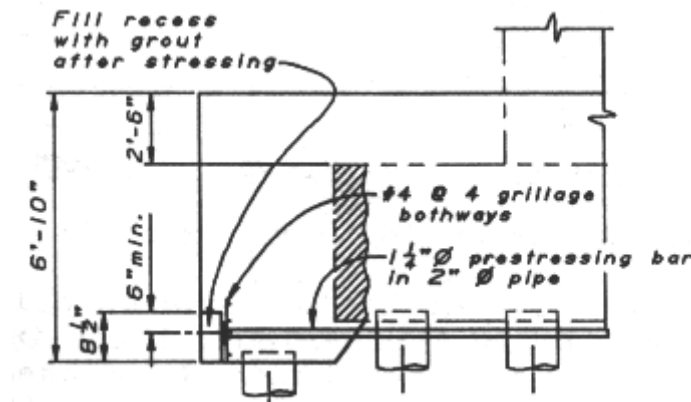
Sometimes the existing piles are reattached by excavating under the footing, attaching high strength bolts to the top of the piles, placing new reinforcement under the footing, and casting new concrete in the excavation.



Reattaching Existing Piles to Footing.

A testing program at Caltrans (Mason, 1995) identified a number of innovative new piles that are able to provide tension even in Bay mud. Some of these pile systems, like the Dutch Fundex System, are segmental and can be placed under bridge decks which make them well suited for retrofits.

In situations where there is not enough reinforcement in the bottom of footings to handle the moment, prestressing tendons can be used. This has the added advantage of increasing the shear capacity of the footing. The Coyote Wells Overhead on Route 8 in Imperial County had a footing retrofit. New piles were placed along the outside of the existing footing, and the footing was extended outward and below the existing footing. Then holes were drilled under the existing footing and through the new footing extension. Prestress ducts with prestress tendons were placed in the holes. When the tendons were stressed and anchored to the new footing, the required moment capacity was provided. The prestressing also helped to secure the footing extension and piles to the existing footing.

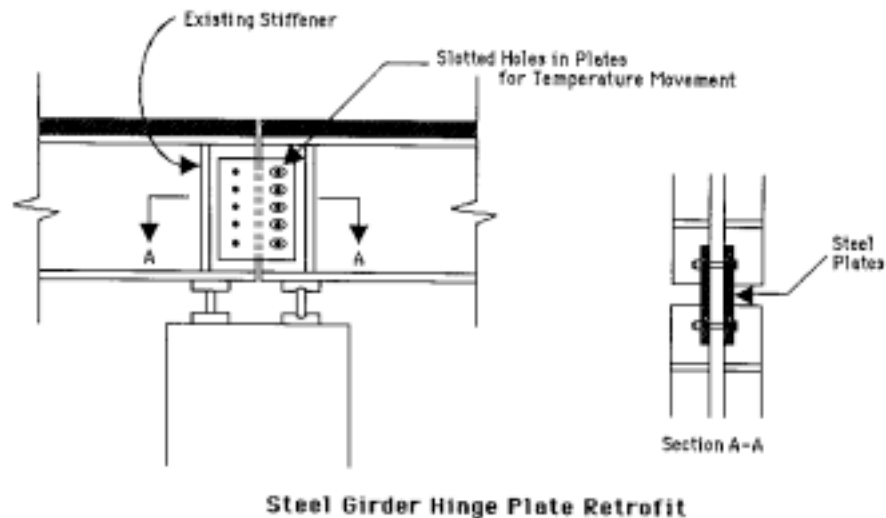


Prestressed Footing Retrofit at Coyote Wells.

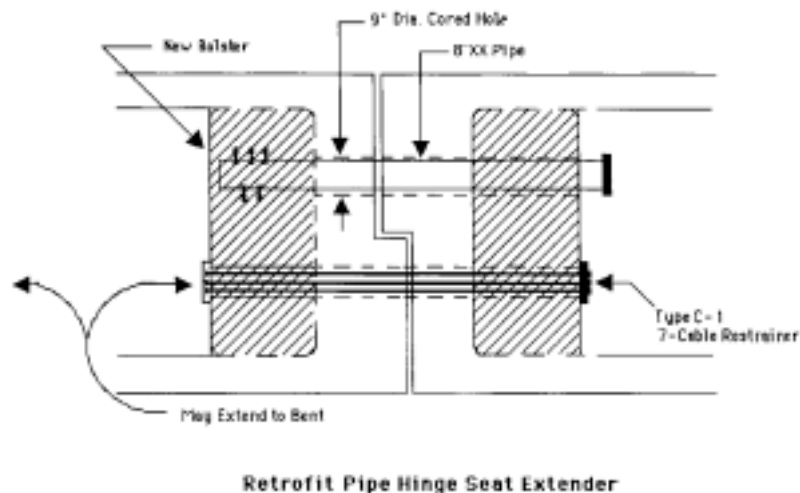
Expansion Joint Retrofits

Retrofits to prevent the superstructure from falling at expansion joints have become more sophisticated over the years. Originally, cable restrainers were used to prevent superstructures from falling off narrow seats. However, because of the ambivalent performance of restrainers during past earthquakes, newer retrofits provide a more reliable method of preventing

unseating, either by locking the joint or by extending the seat in various ways. For steel superstructures, plates are sometimes used to connect the girders at expansion joints. This provides a strong, positive load path for the inertia force as well as providing a seat if one of the girders falls off of its support.



Similarly, pipe seat extenders are placed at the hinges of reinforced concrete box girder bridges to prevent unseating. Holes are cored through the hinge, steel pipes are inserted in the holes, and concrete bolsters are cast at both ends. One end of the pipe is fixed to the bolster while the other pipe end is free to translate back and forth. If the hinge opens too far, the double extra strong pipe can support the superstructure.



There are many variations to these devices that either lock or provide support at expansion joints. Steel girders were placed under the hinges at the Santa Monica Freeway in Los Angeles to provide a longer seat.



External Hinge Extenders on Santa Monica Freeway

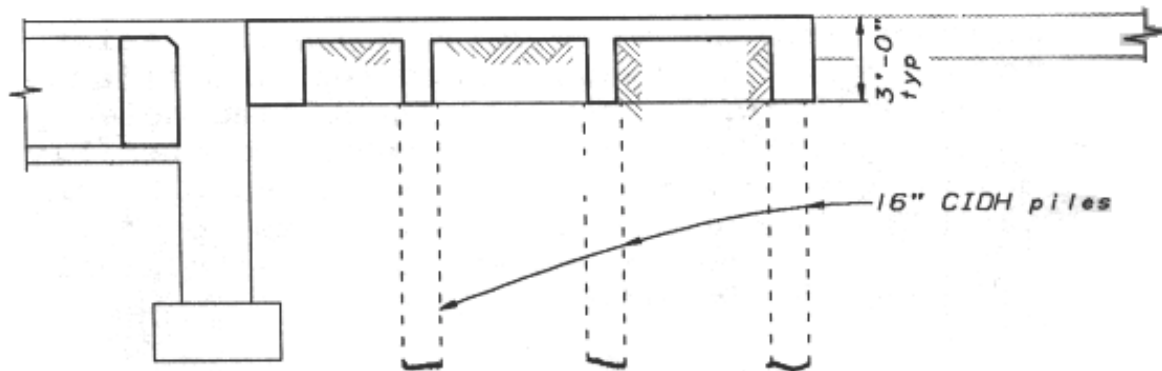
Catcher blocks are often cast in front of the ends of steel and concrete girders to prevent them from falling. Transverse and longitudinal shear keys, vertical restrainers, keeper plates, etc. are all common retrofits. Sometimes steel rods and brackets are used to lock a short seat. One must provide abundant strength for these connections, as they are otherwise likely to break during large earthquakes.



Locking Device at Abutment Seat of Pedestrian Overcrossing.

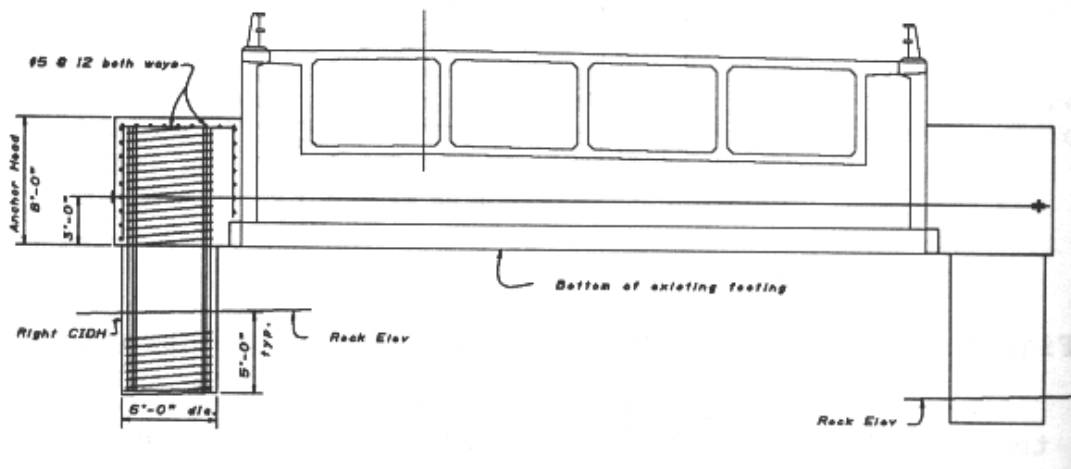
Abutment Retrofits

Stiffening and strengthening abutments to take more load and to immediately engage the soil has become a big part of new seismic retrofits. This is particularly helpful when the end bents are very stiff and would otherwise take much of the load and fail during a large earthquake. Timber is often placed between the abutment backwall and the superstructure end diaphragm to immediately engage the soil during an earthquake. Then special approach slabs, piles, and tieback systems help hold onto the bridge while absorbing energy. The figure below shows a waffle approach slab that is sometimes used to anchor the abutment to the surrounding soil.



Seismic Waffle Slab.

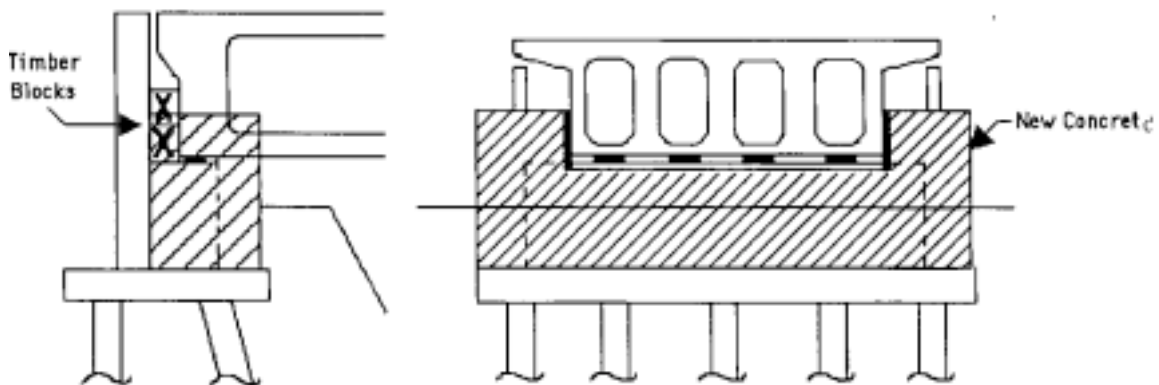
Similarly, concrete blocks and other devices extend behind the abutment to engage the soil. Concrete haunches (often supported on large diameter piles) are used to support the structure transversely. Often, the haunches on each side of the abutment are tied together with cables to make them work together as the abutment moves from side to side.



Abutment Haunch with CIDH Piles and Cable.



Photo of Abutment Retrofit with Haunches.



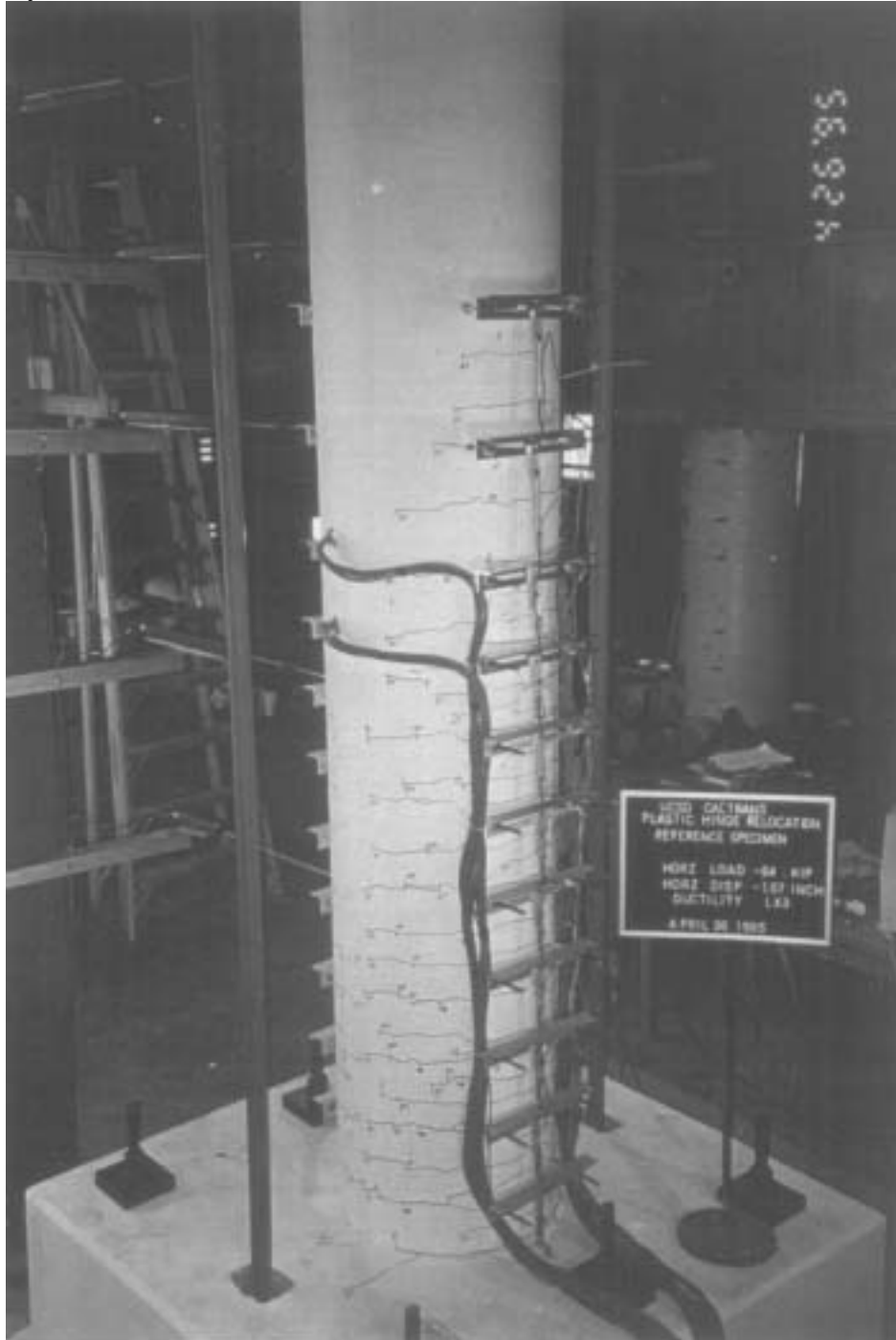
Exterior Shear Key Retrofit @ Abutment

Abutment Shear Key Retrofit

The figure above shows what used to be the most common bridge retrofit which was to provide exterior shear keys at abutments to prevent transverse movement of the superstructure. Note that timber blocking is provided in the gallery between the backwall and the superstructure so that the soil will be more quickly engaged during the earthquake, less banging will occur, and the brittle concrete backwall is protected.

DAMAGE PHOTOS FROM THE DESTRUCTIVE TESTING OF BRIDGE MEMBERS

A good way to determine the extent of damage to bridges in the field is by familiarizing yourself with damage in the lab. By studying these and other photos, the investigator will obtain a better perspective on what a column looks like after displacing two, three, or four times past yield.



Third Cycle at Disp. = Ductility 1.0 at UCSD for Reference Column
(Relocation of Plastic Hinge Tests).

This specimen was designed conventionally to allow a column hinge to form at the footing. It is a 2 ft diameter, 12 ft tall concrete column with 20 #7 bars and a #3 spiral at a 3" pitch.



Third Cycle at Disp. = Ductility 2.0 at UCSD for Reference Column
(Relocation of Plastic Hinge Tests).



Ductility 8.0 at UCSD for Reference Column (**Relocation of Plastic Hinge Tests**).



Failure at UCSD for Reference Column (**Relocation of Plastic Hinge Tests**).

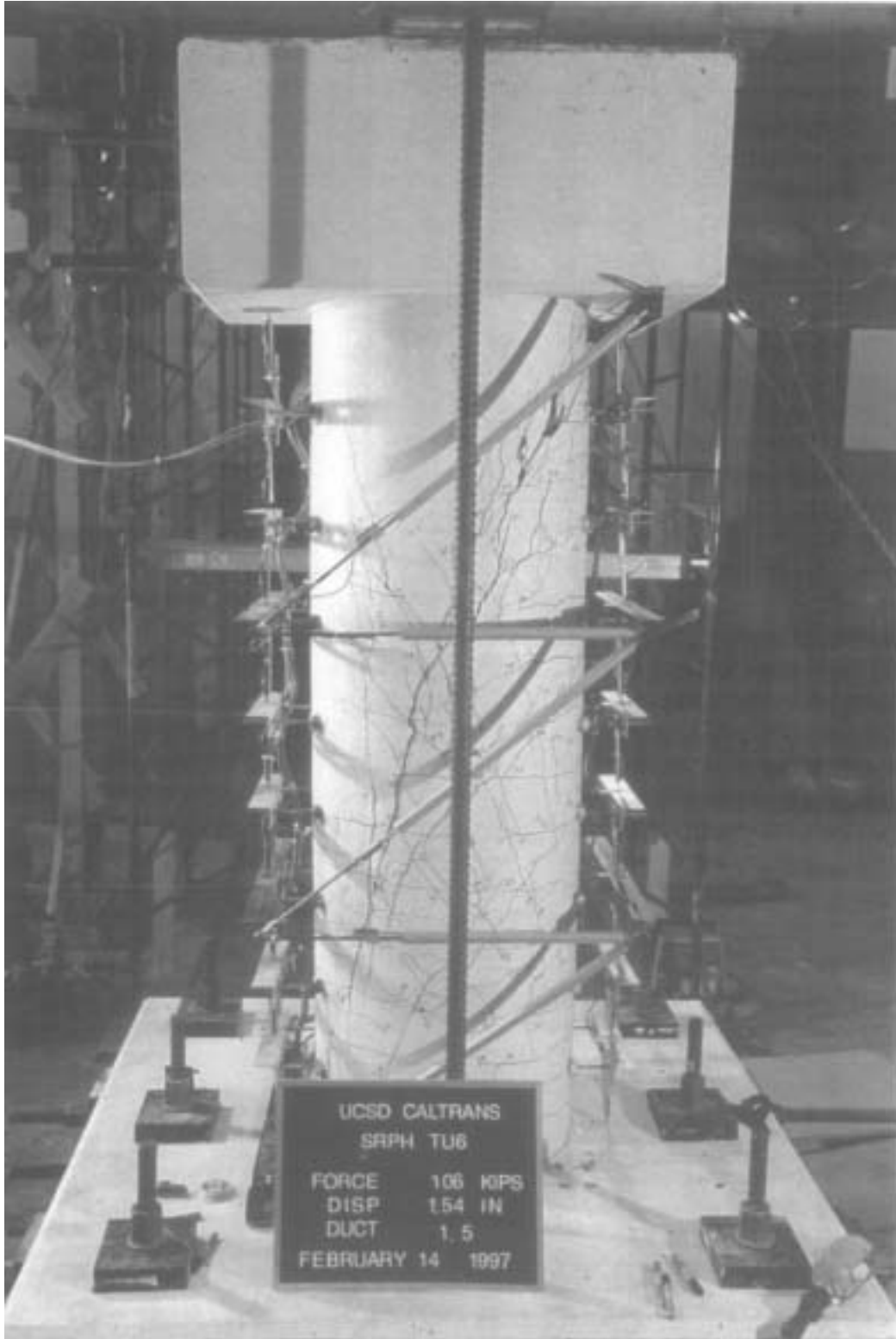


Yield for Shear Column at UCSD
(Relocation of Plastic Hinge Tests).

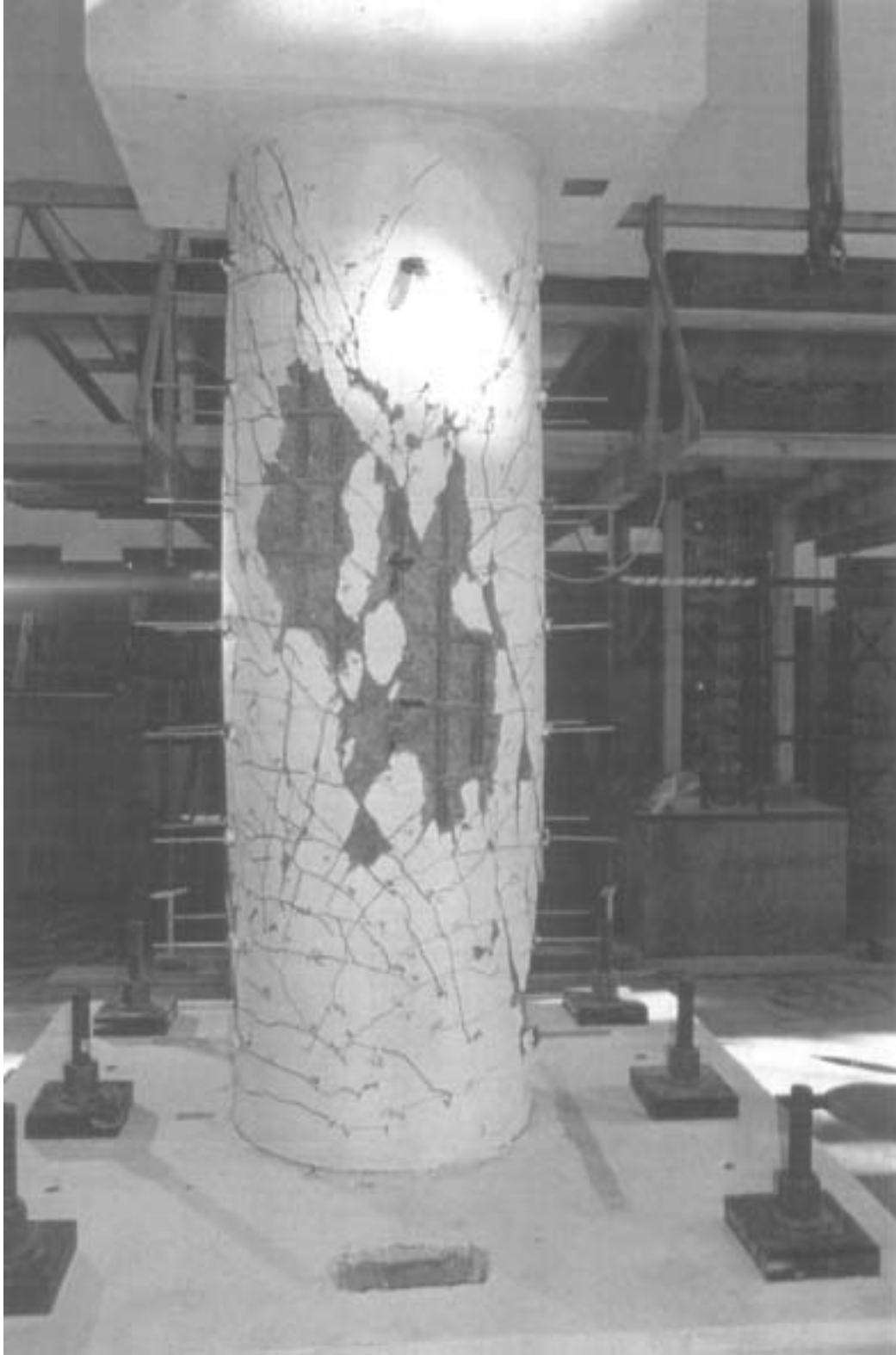
This specimen was designed with additional longitudinal reinforcement at the base of the column to force plastic hinging one column diameter above the footing. However, the transverse reinforcement was limited to cause a shear failure at a ductility of 2.0.



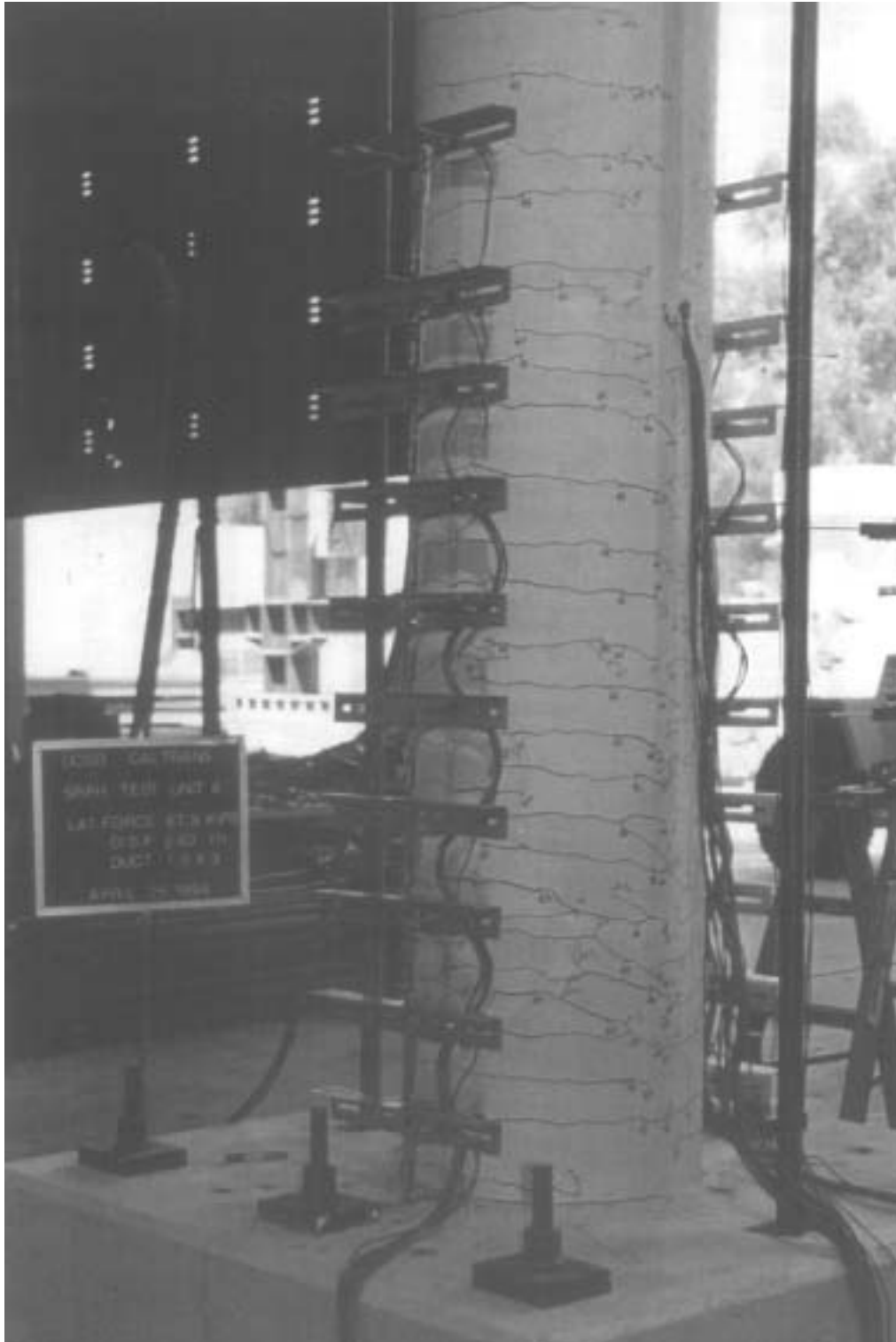
Ductility of 1.0 for Shear Column at UCSD
(Relocation of Plastic Hinge Tests).



Ductility 1.5 for Shear Column at UCSD
(Relocation of Plastic Hinge Tests).



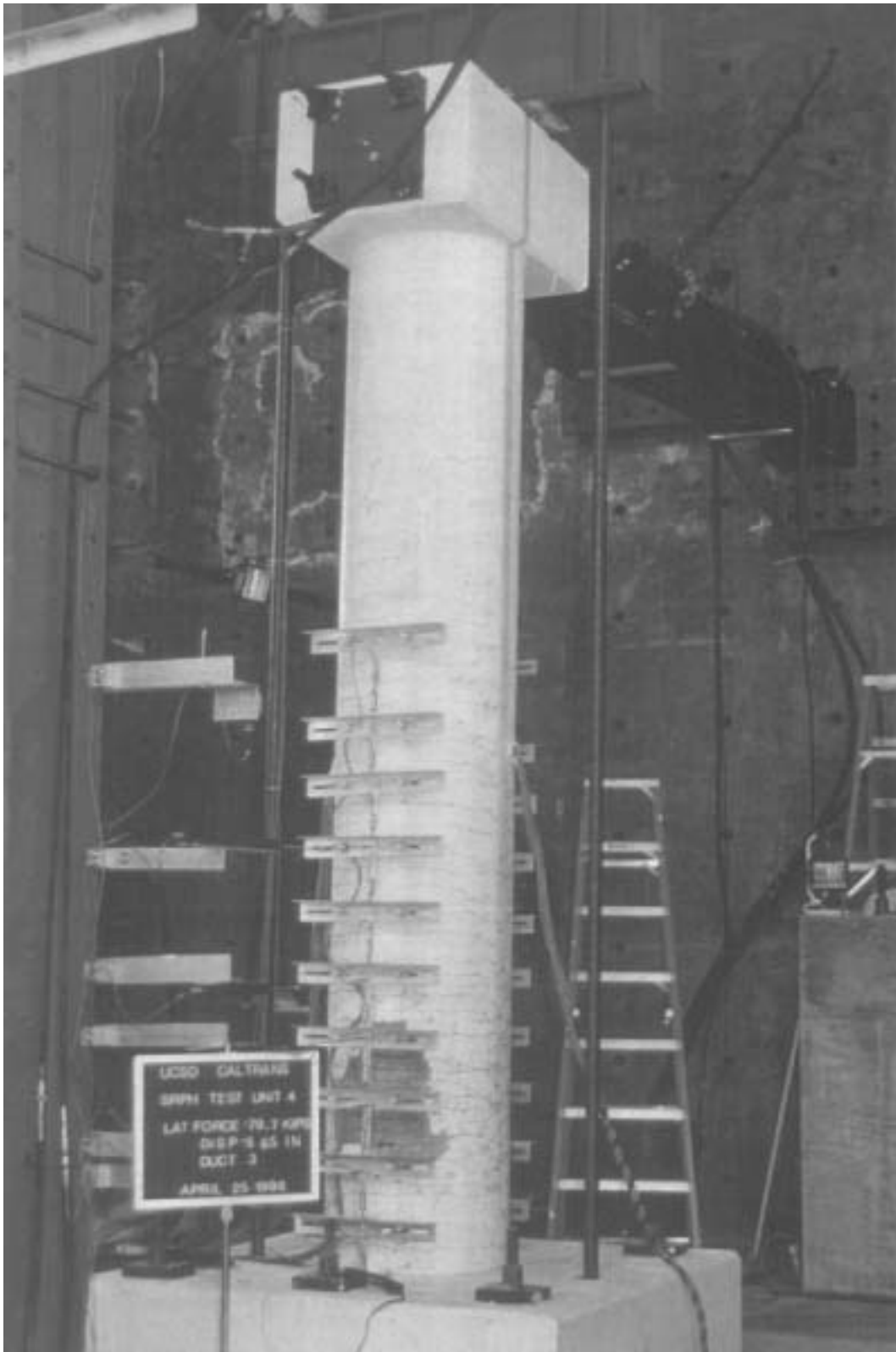
End of Test at UCSD for Shear Column (Ductility < 2.0)
(Relocation of Plastic Hinge Tests).



Ductility 1.5 at UCSD for Test Unit 4, Staggered Termination $\rho_s = 2.3\%$.

(Relocation of Plastic Hinge Tests).

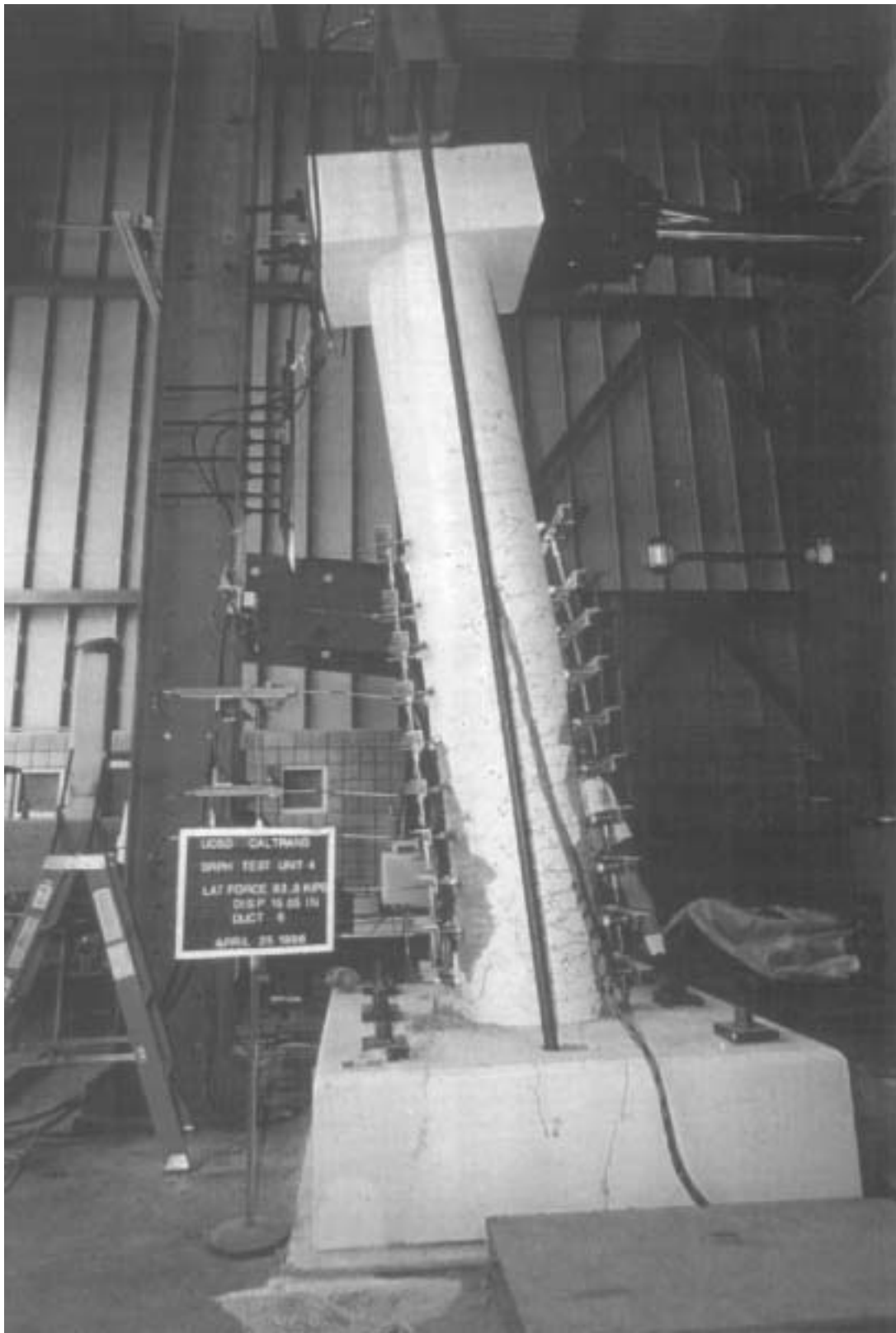
An extremely ductile column (#4 spiral w/ 1.5" pitch) with inner cage bars terminated to force the plastic hinge to occur 18" above the footing.



Ductility 3.0 at UCSD for Test Unit 4
(Relocation of Plastic Hinge Tests).



Ductility 4.0 at UCSD for Test Unit #4
(Relocation of Plastic Hinge Location Tests).



Ductility 8.0 at UCSD for Test Unit #4
(Relocation of Plastic Hinge Location Tests).

California Earthquake History 1769-Present

Studying previous California earthquakes will give the investigator a better perspective on the earthquake they are investigating. This list includes California, Baja California, and Nevada events. The **magnitude** listed here is the "summary magnitude". For most events prior to 1898 this is based on the adjusted intensity magnitude, and for events after 1898 it is the surface wave magnitude. The list includes known earthquakes with a magnitude of at least 6 and selected smaller events. The smaller events since 1898 all have at least one reported magnitude of at least 5.8, even if the summary magnitude is smaller. Some of these magnitudes may be different than what is reported in the Southern California or Northern California Earthquake Catalog. The **date and time** for each earthquake are given as "24 hour" time referenced to Greenwich Mean Time (now UTC). To convert a time to Pacific Standard Time (PST), subtract 8 hours. To convert a time to Pacific Daylight Time (PDT), where appropriate, subtract 7 hours. **Example:** The 1989 Loma Prieta earthquake occurred at 00:04 UTC on October 18, 1989 or 5:04pm PDT on October 17, 1989.

Ellsworth, W. L., "Earthquake History, 1769-1989" USGS Professional Paper 151 (modified to present)










DATE	TIME(GMT)	LATITUDE	LONGITUDE	MAG	LOCATION
1769	7 28 0 0	34	0.00 118 0.00	6.0	Los Angeles Basin
1800	11 22 2130	33	0. 117 18.00	6.5	San Diego region
1808	6 24 0 0	37	48.00 122 30.00	6.0	San Francisco region
1812	12 8 15 0	34	22.00 117 39.00	7.0	Wrightwood
1812	12 21 19 0	34	12.00 119 54.00	7.0	Santa Barbara Channel
1827	9 24 4 0	34	0. 119 0.	5.5	Los Angeles region
1836	6 10 1530	37	48.00 122 12.00	6.75	Hayward Valley
1838	6 0 0 0	37	36.00 122 24.00	7.0	San Francisco Peninsula
1852	11 29 20 0	32	30.00 115 0.	6.5	Volcano Lake, B.C.
1855	7 11 415	34	6.00 118 6.00	6.0	Los Angeles region
1856	2 15 1325	37	30.00 122 18.00	5.5	San Francisco Peninsula
1857	1 9 16 0	35	42.00 120 18.00	8.25	Great Fort Tejon quake
1857	9 3 3 5	39	18.00 120 0.	6.25	W. Nevada or E. Sierra
1858	11 26 835	37	30.00 121 54.00	6.25	San Jose region
1858	12 16 10 0	34	0. 117 30.00	6.0	San Bernardino region
1860	3 15 19 0	39	30.00 119 30.00	6.5	Carson City, Nevada
1861	7 4 011	37	48.00 122 0.	5.75	San Ramon Valley
1862	5 27 20 0	32	42.00 117 12.00	6.0	San Diego region
1864	2 26 1347	37	6.00 121 42.00	6.0	S. Santa Cruz Mountains
1864	3 5 1649	37	42.00 122 0.	5.75	E. of San Francisco Bay
1865	10 8 2046	37	0.00 122 00.00	6.5	S. Santa Cruz Mountains
1866	7 15 0630	37	30.00 121 18.00	6.0	W. San Joaquin Valley
1868	5 30 510	39	18.00 119 42.00	6.0	Virginia City, Nevada
1868	10 21 1553	37	42.00 122 6.00	7.0	Hayward fault
1869	12 27 155	39	24.00 119 42.00	6.25	Olinghouse fault, Nevada
1869	12 27 10 0	39	6.00 119 48.00	6.0	Carson City, Nevada
1870	2 17 2012	37	12.00 122 6.00	6.0	Los Gatos
1871	3 2 21 5	40	24.00 124 12.00	6.0	Cape Mendocino
1872	3 26 1030	36	42.00 118 6.00	7.6	Owens Valley
1872	3 26 14 6	36	54.00 118 12.00	6.75	Owens Valley
1872	4 3 1215	37	0. 118 12.00	6.25	Owens Valley
1872	4 11 19 0	37	30.00 118 30.00	6.75	Owens Valley
1872	5 3 1 0	33	0. 115 0.	5.75	Imperial Valley (?)
1872	11 12 0 0	39	0. 117 0.	6.0	Austin, Nevada region(?)
1873	11 23 5 0	42	0. 124 0.	6.75	Crescent City
1875	1 24 1200	40	42. 120 30.	6.0	Honey Lake
1875	11 15 2230	32	30.00 115 30.00	6.25	Imperial Valley to ColRv
1878	5 9 425	40	6.00 124 0.	6.0	Punta Gorda region
1881	2 2 011	36	0. 120 30.00	5.75	Parkfield

1881	4	10	10	0	37	24.00	121	24.00	6.0	W. San Joaquin Valley
1882	3	6	2145		36	54.	121	12.	5.75	Hollister
1883	9	5	1230		34	12.00	119	54.00	6.25	Santa Barbara Channel
1884	1	28	730		41	6.	123	36.	5.75	Klamath Mountains
1884	3	26	40		37	6.	122	12.	6.0	Santa Cruz Mountains
1885	1	31	545		40	24.	120	36.	5.75	Susanville
1885	4	12	4	5	36	24.00	121	0.	6.25	S. Diablo Range
1887	6	3	1048		39	12.00	119	48.00	6.5	Carson City, Nevada area
1888	4	29	448		39	42.00	120	42.00	6.0	Mohawk Valley
1889	5	19	1110		38	0.	121	54.00	6.25	Antioch
1889	6	20	6	0	40	30.00	120	42.00	6.0	Susanville
1889	9	30	520		37	12.	118	42.	5.75	Bishop region
1890	2	9	12	6	33	24.00	116	18.00	6.5	San Jacinto Fault region
1890	4	24	1136		36	54.00	121	36.00	6.25	Pajaro Gap
1890	7	26	940		40	30.00	124	12.00	6.25	Cape Mendocino
1891	7	30	1410		32	0.	115	0.	6.0	Colorado R. delta region
1892	2	24	720		32	33.00	115	38.00	7.0	Laguna Salada, B.C.
1892	4	19	1050		38	24.00	122	0.	6.5	Vacaville
1892	4	21	1743		38	30.00	121	54.00	6.25	Winters
1892	5	28	1115		33	12.00	116	12.00	6.5	San Jacinto fault region
1892	11	13	1245		36	48.00	121	30.00	5.75	Hollister
1893	5	19	035		34	6.00	119	24.00	5.75	Pico Canyon
1894	7	30	512		34	18.00	117	36.00	6.0	Lytle Creek region
1894	9	30	1736		40	18.	123	42.	6.0	Cape Mendocino region
1894	10	23	23	3	32	48.00	116	48.00	5.75	E. of San Diego
1896	8	17	1130		36	42.00	118	18.00	6.0	SE Sierra Nevada
1897	6	20	2014		37	0.	121	30.00	6.25	Gilroy
1898	3	31	743		38	12.00	122	24.00	6.5	Mare Island
1898	4	15	7	7	39	12.00	123	48.00	6.5	Mendocino
1899	4	16	1340		41	0.	126	0.	7.0	W. of Eureka
1899	7	6	2010		37	12.	121	30.	5.75	Morgan Hill
1899	7	22	2032		34	18.00	117	30.00	5.75	Lytle Creek region
1899	12	25	1225		33	48.00	117	0.	6.4	San Jacinto and Hemet
1901	3	3	745		36	0.	120	30.00	6.4	Parkfield
1903	1	24	527		31	30.00	115	0.00	6.6	Colorado R. delta region
1903	6	11	1312		37	24.00	121	54.00	5.5	San Jose
1903	8	3	649		37	18.00	121	48.00	5.5	San Jose
1906	4	18	1312		37	42.00	122	30.00	8.25	Great 1906 earthquake
1906	4	19	030		32	54.00	115	30.00	6.2	Imperial Valley
1906	4	23	910		41	0.	124	0.	6.4	Arcata
1907	9	20	154		34	12.00	117	6.00	5.3	San Bernardino region
1908	11	4	837		36	0.	117	0.	6.0	Death Valley region
1909	10	29	645		40	30.00	124	12.00	5.8	Cape Mendocino
1910	3	11	652		36	54.00	121	48.00	5.8	Watsonville
1910	3	19	011		40	0.	125	0.	6.0	W. of Cape Mendocino
1910	5	15	1547		33	42.00	117	24.00	5.5	Glen Ivy Hot Springs
1910	8	5	131		42	0.	127	0.	6.6	W. of Crescent City
1911	7	1	22	0	37	15.00	121	45.00	6.5	Calaveras fault
1914	2	18	1817		39	30.00	119	48.00	5.5	Truckee region
1914	4	24	834		39	30.00	119	48.00	6.0	Truckee region
1915	5	6	12	9	40	0.00	126	0.	6.2	W. of Cape Mendocino
1915	6	23	359		32	48.00	115	30.00	6.0	Imperial Valley
1915	6	23	456		32	48.00	115	30.00	5.9	Imperial Valley
1915	10	3	652		40	30.00	117	30.00	7.3	Pleasant Valley, Nevada
1915	11	21	013		32	0.	115	0.	7.1	Volcano Lake, B.C.
1915	12	31	1220		41	0.	126	0.	6.5	W. of Eureka
1916	2	3	5	3	41	0.	117	48.00	5.9	N. of Pleasant Valley, NV
1916	10	23	244		34	54.00	118	54.00	5.3	Tejon Pass region
1916	11	10	911		35	30.00	116	0.	6.1	S. of Death Valley
1918	4	21	2232		33	48.00	117	0.	6.9	San Jacinto
1918	7	15	023		41	0.	125	0.	6.5	W. of Eureka
1922	1	26	931		41	0.	126	0.	6.0	W. of Eureka
1922	1	31	1317		41	0.	125	30.00	7.3	W. of Eureka
1922	3	10	1121		36	0.	120	30.00	6.3	Parkfield

1923	1	22	9	4	40	30.00	124	30.00	7.2	Cape Mendocino
1923	7	23	730		34	0.	117	18.00	6.0	San Bernardino region
1925	6	4	12	2	41	30.00	125	0.	6.0	W. of Eureka
1925	6	29	1442		34	18.00	119	48.00	6.3	Santa Barbara
1926	10	22	1235		36	37.00	122	21.00	6.1	Monterey Bay
1926	10	22	1335		36	33.00	122	11.00	6.1	Monterey Bay
1926	12	10	838		40	45.00	126	0.	6.0	W. of Cape Mendocino
1927	9	18	2	7	37	30.00	118	45.00	6.0	Bishop region
1927	11	4	1350		34	42.00	120	48.00	7.3	SW of Lompoc
1932	6	6	844		40	45.00	124	30.00	6.4	Eureka
1932	12	21	610		38	45.00	118	0.	7.2	Cedar Mountain, Nevada
1933	1	5	651		38	46.00	117	44.00	5.9	Cedar Mountain, Nevada
1933	3	11	154		33	37.00	117	58.00	6.3	Long Beach
1933	6	25	2045		39	4.00	119	20.00	6.1	Yerington, Nevada
1934	1	30	2016		38	18.00	118	24.00	6.3	Excelsior Mountain, NV
1934	6	8	447		36	0.	120	30.00	6.0	Parkfield
1934	7	6	2248		41	15.00	125	45.00	6.5	W. of Eureka
1934	12	30	1352		32	15.00	115	30.00	6.5	Laguna Salada, B.C.
1934	12	31	1845		32	0.	114	45.00	7.0	Colorado R. delta
1935	2	24	145		31	59.00	115	12.00	5.3	Colorado R. delta
1936	6	3	915		40	0.	125	30.00	5.9	W. of Cape Mendocino
1937	3	25	1649		33	24.00	116	16.00	6.0	Buck Ridge
1940	2	8	8	5	39	45.00	121	15.00	6.0	Chico
1940	5	19	436		32	44.00	115	30.00	7.1	Imperial Valley
1940	12	7	2216		31	40.00	115	5.00	5.5	Colorado R. delta
1941	2	9	944		40	42.00	125	24.00	6.6	W. of Cape Mendocino
1941	4	9	1708		31	0.00	114	0.00	5.3	Gulf of California
1941	5	13	16	1	40	18.00	126	24.00	6.0	W. of Cape Mendocino
1941	7	1	750		34	22.00	119	35.00	5.9	Carpenteria
1941	9	14	1643		37	34.00	118	44.00	5.8	Tom's Place
1941	9	14	1839		37	34.00	118	44.00	6.0	Tom's Place
1941	10	3	1613		40	24.00	124	48.00	6.4	W. of Cape Mendocino
1942	10	21	1622		33	3.00	116	5.	6.5	Fish Creek Mountains
1942	12	3	944		39	42.00	119	18.00	5.9	N. of Wadsworth, Nevada
1945	5	19	15	7	40	24.00	126	54.00	6.2	W. of Cape Mendocino
1945	9	28	2224		41	54.00	126	42.00	6.0	W. of Crescent City
1946	3	15	1349		35	44.00	118	3.00	6.3	Walker Pass
1947	4	10	1558		34	59.00	116	33.00	6.4	Manix
1948	12	4	2343		33	56.00	116	23.00	6.5	Desert Hot Springs
1948	12	29	1253		39	33.00	120	5.00	6.0	Verdi, Nevada
1949	3	25	456		41	18.00	126	0.	6.2	W. of Eureka
1949	5	2	1125		34	1.	115	41.00	5.9	Pinto Mountain
1951	10	8	410		40	15.00	124	30.00	6.0	W. Of Cape Mendocino
1951	12	26	046		32	48.00	118	18.00	5.9	San Clemente Island
1952	7	21	1152		35	0.	119	1.00	7.7	Kern County earthquake
1952	7	21	12	5	35	0.	119	0.	6.4	Kern County
1952	7	23	038		35	22.00	118	35.00	6.1	Kern County
1952	7	29	7	3	35	23.00	118	51.00	6.1	Bakersfield
1952	11	22	746		35	44.00	121	12.00	6.0	Bryson
1954	1	12	2333		35	0.	119	1.00	5.9	W. of Wheeler Ridge
1954	3	19	954		33	17.00	116	11.00	6.2	Arroyo Salada
1954	7	6	1113		39	25.00	118	32.00	6.6	Rainbow Mountain, Nevada
1954	7	6	22	7	39	18.00	118	30.00	6.4	Rainbow Mountain, Nevada
1954	8	24	551		39	35.00	118	27.00	6.8	Stillwater, Nevada
1954	8	31	2220		39	30.00	118	30.00	6.3	Stillwater, Nevada
1954	10	24	944		31	30.00	116	0.	6.0	W. of Santo Tomas, B.C.
1954	11	12	1226		31	30.00	116	0.	6.3	W. of Santo Tomas, B.C.
1954	11	25	1116		40	16.00	125	38.00	6.5	W. of Cape Mendocino
1954	12	16	11	7	39	19.00	118	12.00	7.1	Fairview Peak, Nevada
1954	12	16	1111		39	30.00	118	0.	6.8	Dixie Valley, Nevada
1954	12	21	1956		40	56.00	123	47.00	6.6	E. of Arcata
1956	2	9	1432		31	45.00	115	55.00	6.8	San Miguel, B.C.
1956	2	9	1524		31	45.00	115	55.00	6.1	San Miguel, B.C.
1956	2	14	1833		31	30.00	115	30.00	6.3	San Miguel, B.C.

1956	2	15	120	31	30.00	115	30.00	6.4	San Miguel, B.C.
1956	10	11	1648	40	40.00	125	46.00	6.0	W. of Cape Mendocino
1956	12	13	1315	31	0.	115	0.	6.0	W. shore, Gulf of Calif.
1959	3	23	710	39	36.00	118	1.00	6.3	Dixie Valley, Nevada
1959	6	23	1435	39	5.00	118	49.00	6.1	Schurz, Nevada
1960	8	9	739	40	19.00	127	4.00	6.2	W. of Cape Mendocino
1966	6	28	426	36	0.	120	30.00	6.0	Parkfield
1966	8	7	1736	31	48.00	114	30.00	6.3	Gulf of California
1966	9	12	1641	39	25.00	120	9.00	6.0	Truckee
1968	4	9	228	33	11.00	116	8.00	6.5	Borrego Mountain
1968	6	26	142	40	14.00	124	16.00	5.4	Punta Gorda
1971	2	9	14 0	34	25.00	118	24.00	6.5	San Fernando
1973	2	21	1445	34	4.00	119	2.00	5.2	Point Mugu
1976	11	26	1119	41	18.00	125	42.00	6.3	W. of Orick
1979	8	6	17 5	37	7.00	121	31.00	5.7	Coyote Lake
1979	10	15	2316	32	36.00	115	18.00	6.5	Imperial Valley
1980	01	24	1900	37	50.00	121	47.00	5.8	Livermore
1980	5	25	1633	37	36.00	118	50.00	6.1	Mammoth Lakes
1980	5	25	1649	37	39.00	118	54.00	5.9	Mammoth Lakes
1980	5	25	1944	37	33.00	118	49.00	5.8	Mammoth Lakes
1980	5	27	1450	37	29.00	118	48.00	6.0	Mammoth Lakes
1980	6	9	328	32	12.00	115	5.00	6.4	Victoria, B.C.
1980	11	8	1027	41	7.00	124	40.00	7.2	W. of Eureka
1981	4	26	1209	33	8.00	115	39.00	6.0	Westmorland
1981	9	4	1550	33	40.00	119	7.00	5.9	N. of Santa Barbara Isl.
1981	9	30	1153	37	35.00	118	52.00	5.8	Mammoth Lakes
1983	5	2	2342	36	14.00	120	19.00	6.5	Coalinga
1983	7	22	239	36	14.00	120	25.00	5.7	Coalinga
1984	4	24	2115	37	19.00	121	39.00	6.1	Morgan Hill
1984	9	10	314	40	23.00	127	9.00	6.7	Mendocino Fracture Zone
1984	11	23	18 8	37	27.00	118	36.00	5.7	Round Valley
1985	8	4	12 1	36	8.00	120	10.00	5.9	North Kettleman Hills
1986	7	8	920	34	0.	116	36.00	6.0	North Palm Springs
1986	7	20	1429	37	34.00	118	26.00	5.6	Chalfant Valley
1986	7	21	1442	37	32.00	118	26.00	6.2	Chalfant Valley
1986	7	31	722	37	28.00	118	22.00	5.2	Chalfant Valley
1987	10	1	1442	34	3.00	118	5.00	5.8	Whittier Narrows
1987	11	24	153	33	4.00	115	47.00	6.2	Elmore Ranch fault
1987	11	24	1316	33	1.00	115	51.00	6.6	Superstition Hills
1989	10	18	0004	37	2.19	121	52.98	7.1	Loma Prieta
1991	8	16	2226	41	38.00	125	52.00	6.3	W. of Crescent City
1991	8	17	1929	40	17.00	124	14.00	6.2	Punta Gorda
1991	8	17	2217	41	41.00	126	3.00	7.1	W. of Crescent City
1992	4	23	450	33	58.00	116	19.00	6.1	Joshua Tree
1992	4	25	1806	40	20.00	124	14.00	7.2	Cape Mendocino
1992	4	26	741	40	26.00	124	36.00	6.5	Cape Mendocino
1992	4	26	1118	40	23.00	124	35.00	6.6	Cape Mendocino
1992	6	28	1157	34	12.00	116	26.00	7.3	Landers
1992	6	28	1505	34	12.00	116	50.00	6.2	Big Bear
1993	5	17	2320	37	9.00	117	50.00	6.1	Big Pine
1994	1	17	1230	34	13.00	118	32.00	6.7	Northridge
1994	9	01	1515	40	27.00	125	54.00	6.9	Mendocino Fracture Zone
1994	9	12	1223	38	49.00	119	37.00	6.0	Carter's Station, Nevada
1995	2	19	403	40	37.00	125	54.00	6.6	W. of Eureka
1995	9	20	2327	35	46.00	117	38.00	5.5	Ridgecrest
1996	7	24	2016	41	47.04	125	54.66	5.7	W. of Eureka
1997	1	22	717	40	16.32	124	23.64	5.7	Punta Gorda
1999	8	1	1606	37	23.40	117	4.80	5.7	Scotty's Junction, Nevada
1999	10	16	947	34	35.64	116	16.26	7.1	Hector Mine
2000	3	16	1520	40	23.16	125	16.74	5.9	Mendocino Fracture Zone
2003	12	22	1916	35	41.98	121	5.84	6.5	San Simeon
2004	9	28	1815	35	48.60	120	22.22	6.5	Parkfield

Sample Earthquake Evaluation Form

POST EARTHQUAKE BRIDGE EVALUATION FORM					Sheet Number _____
Inspector's Name _____		Affiliation _____		Date _____	Time _____
Earthquake Name _____		Country _____		Region _____	
DESCRIPTION OF BRIDGE			DESCRIPTION OF DAMAGE		
Bridge Name _____ Br. # _____ Route # _____ Location _____ Bridge Bearing _____ Length _____ Number of Spans _____ Simple Spans <input type="checkbox"/> Continuous <input type="checkbox"/> Hinges yes no locations in spans _____ River Xing <input type="checkbox"/> RR Xing <input type="checkbox"/> Interchange <input type="checkbox"/> Other _____			Overall Rating No Damage <input type="checkbox"/> Minor Damage <input type="checkbox"/> Moderate Damage <input type="checkbox"/> Major Damage <input type="checkbox"/> Collapse <input type="checkbox"/>		
Suspension <input type="checkbox"/> Cable Stay <input type="checkbox"/> Steel Truss <input type="checkbox"/> Steel Arch <input type="checkbox"/> Steel Box Girder <input type="checkbox"/> Steel I Girder <input type="checkbox"/> Concrete Box Girder <input type="checkbox"/> Concrete T Girder <input type="checkbox"/> Concrete Slab <input type="checkbox"/> Precast Girder <input type="checkbox"/> Concrete Arch <input type="checkbox"/> Timber Arch <input type="checkbox"/> Timber Truss <input type="checkbox"/> Timber Girder <input type="checkbox"/> Bascule <input type="checkbox"/> Lift <input type="checkbox"/> Swing <input type="checkbox"/> Other _____			Dropped Spans yes _____ no _____ spans _____ Span Movement _____ Girder Damage _____ Other Superstructure Damage _____ Indications of soil movement _____		
BEARING TYPES			Damage	Location	Description
 Roller	 Plane Sliding	Restrainer Hinge Joint	_____ _____ _____	_____ _____ _____	
 Rocker	 Curved Sliding	Bearings Shear Key Abutment	_____ _____ _____	_____ _____ _____	
 Knuckle	 Disc	Bent Bent Cap	_____ _____	_____ _____	
 Leaf	 Elastomeric	Column	_____ _____	_____ _____	
 Link	Isolation/Damping	Footing	_____ _____ _____	_____ _____ _____	
Abutments Seat Type <input type="checkbox"/> Diaphragm <input type="checkbox"/> Other _____ Piers Concrete Walls <input type="checkbox"/> Single Col. <input type="checkbox"/> Multicol. <input type="checkbox"/> Steel Tower <input type="checkbox"/> Single Col. <input type="checkbox"/> Multicol. <input type="checkbox"/> Other _____ Foundations spread <input type="checkbox"/> pile <input type="checkbox"/> pileshaft <input type="checkbox"/> caisson <input type="checkbox"/> other _____			Roll #	Frame #	Photo Log
Retrofit yes _____ no _____ Shear Keys _____ Catcher Blocks _____ Restrainers _____ Abutments _____ Bents _____ Other _____			_____ _____ _____	_____ _____ _____	_____ _____ _____
Additional Comments _____ _____ _____					

SKETCH DAMAGE